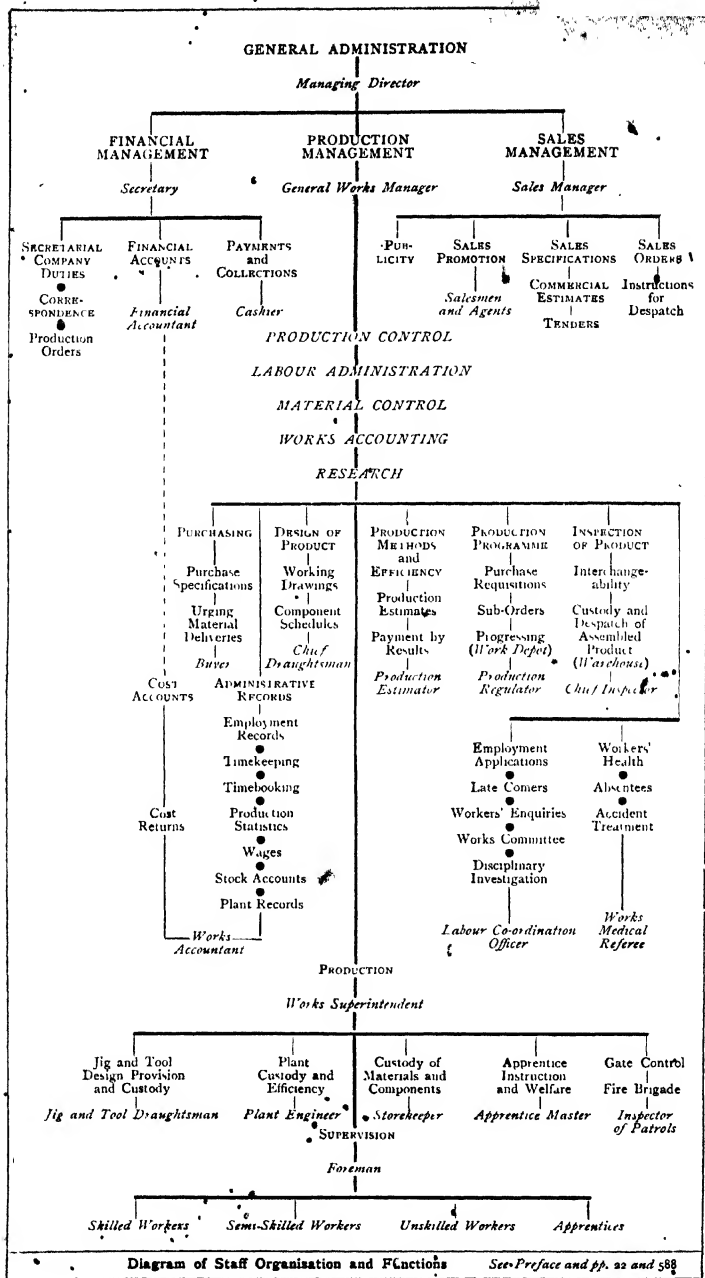




FACTORY ADMINISTRATION
AND
COST ACCOUNTS



FACTORY ADMINISTRATION AND COST ACCOUNTS

A REFERENCE BOOK OF
THE PRINCIPLES AND PRACTICE
OF INDUSTRIAL ADMINISTRATION
AND COSTING
FOR PRESENT DAY REQUIREMENTS

BY

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DEDICATED
BY THE AUTHOR
TO THE MEMORY OF
THE LATE
SIR HARRY S. B. BRINDLEY, K.B.E.
AND
THE LATE
JULIUS S. CONRAD



PREFACE

THE great change now evident in industrial conditions has given added importance to the problem of administration. Grave responsibilities rest on Management to-day to make industrial prosperity and harmony possible; it is no longer enough to trust to personality and intuition being the sole qualifications for successful management. On the one hand, the attainment of greater efficiency brooks no delay and, on the other, involves so many factors, that managers are coming to recognise that industrial administration is an art of which something may be learnt from the experience of others. Very properly, however, there is a reluctance to accept the view that Management is a science reducible to a formula.

The present book is entirely the outcome of practical experience. It discusses principles and demonstrates practice. The author has endeavoured to present the whole subject in such a way that the reader is enabled to get a firmer grasp of his own problems, and thus be put in a position to determine for himself what steps to take, suited to his own particular conditions.

When the time came for making revisions for the seventh reprint of the author's previous work, *Factory Administration and Accounts*, first published in April 1914, he had to recognise that industrial conditions had permanently changed and that the pre-war outlook was quite inadequate to present-day requirements. For example, costing had become an admitted necessity if competition was to be faced with any assurance of ultimate commercial success, and its inter-relation with the achievement of production efficiency had become increasingly clear. Production efficiency itself, as a consequence of universal manufacturing for war purposes, had acquired a new significance. Then again, the relations of Labour with Management and Capital had undergone such a change as to create virtually a new phase altogether. These various considerations left the author no option but to start entirely afresh and on the

foundations of the previous work to re-organise and re-write the whole subject from beginning to end. He has spared no effort to make the book more valuable and its contents more easy of reference than its predecessor ; and, it may be, to help establish the whole art on a sounder basis.

The book is divided into seven main sections :

- I. General Administration.
- II. Works Management— *Production Control.*
- III. " " *Labour Administration.*
- IV. " " *Material Control.*
- V. Works Accounting— *Administrative Records.*
- VI. " " *Cost Accounts.*
- VII. Works Routine— *Specimen Forms.*

A diagram of Staff Organisation and Functions has been given as a Frontispiece to serve as a general guide to the scheme of the book, but the author does not wish it to be understood that administration can only be efficiently carried out when all the officials indicated in the diagram are employed. The object of the chart is to picture the functions to be served, and only by way of illustration to show the separate officials likely to be necessary in the larger works ; in the smaller works one official may have to combine a number of functions. It is always desirable to be clear what functions each official in any given works is supposed to exercise, and it is hoped that the chart will prove useful in that connection. There is some merit in keeping the functions separately grouped as shown in the diagram, but local circumstances must determine how far the principle can be applied.

Emphasis is laid on the fact that the book deals essentially with principles ; that the practical applications given are by way of illustration, and in no sense is the book to be construed as the exposition of a particular system, in any hard and fast sense. There is, for instance, a complete statement of a costing system right up to the Works Profit and Loss Account, but the principles discussed have equal bearing on any other system.

In this connection it may be remarked that Industry falls into two broad divisions of component manufacture and process manufacture, but much as this affects the precise form of system, the principles of administration generally are common to all industries, to the brewery and the boot factory, to the shipbuilding yard and

the textile mill. For convenience machine manufacture has been taken as typical of component industries, and the Foundry and Smithy of process industries.

A system of cross-references has been developed throughout the text, so that once the reader has found his particular subject through the index, he is automatically referred by the marginal page references to other pages bearing on the same subject. This method facilitates easy reference, because no prolonged reading is necessary, to get to the particular point under enquiry, and at the same time the danger of taking too limited a survey of any question is practically obviated.

The illustrations of specimen forms, to which Section VII. is devoted, are included to elucidate the principles discussed in the body of the book.

The Form Nos. (F. 1, etc.) are quoted in the margin of the text wherever a reference to the respective illustration is likely to be useful, and, on the page opposite the illustration in question, cross reference is given to the various aspects of administration with which each form is concerned.

An exhaustive General Index has been provided, together with a Supplementary Index to the specimen form titles. Much care has been taken to give the alternative terms, known to be in use in various industries, so that the reader should have no difficulty in connecting up with the terms preferred by the author. The Glossary Appendix gives notes on the more important terms used.

E. T. ELBOURNE.

January, 1921.



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I

GENERAL ADMINISTRATION

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I A

MANUFACTURING POLICY

It is obvious that the conditions of industry have become irrevocably different from the pre-war state. Labour during the war demonstrated its right to consideration as a partner in Industry with Capital and Management, by the general acceptance of its all-important place in industry, and its demands for larger pay have been conceded to such an extent that the industrial association of Labour and Capital must always be a very serious problem and only by a marked increase in production efficiency, with its elimination of all waste, can permanent prosperity be hoped for.

Choice of
Manufacturing
Policy.

During the war, with the nation spending on a colossal scale, manufacturers had small occasion to consider the principles of production efficiency. At the same time they were the beneficiaries of a mass production manufacturing policy forced upon them by the Government owing to the gigantic requirements for war purposes. This entailed production in many directions besides munitions proper.

The commercial advantage of mass production or continuity of individual processes, in the way of increased output, was brought home to thousands of manufacturers in unmistakable fashion, and the workers also experienced the benefits of the larger earnings made possible by these conditions—without, the total cost per article made fell in a startling fashion.

Manufacturers in all trades during the war undertook contracts which in normal times would have frightened them, and for the most part executed them with credit.

The halo of the higher branches of engineering, such as ordnance manufacture, was not proof against the courage born of the nation's necessities, and, despite the fine limits of accuracy, gun manufacture and the like were successfully carried through by firms who would never have dared before the war to be so ambitious. There is ground for very real and permanent encouragement in the war achievements of the engineering trade from one end to the other.

**Choice of
Manufacturing
Policy.**

achievements whose stimulating effect will continue to react on all trades using machinery or other products of engineering.

In manufacturing policy unquestionably lies the key to commercial efficiency and success. No methods or systems of organisation, no skill in administration, and certainly no sentiment, will be of avail unless the essentials of successful trading be inherent in the manufacturing policy adopted.

Labour is as vitally concerned with commercial efficiency as Capital, although it naturally falls to Capital, in collaboration with Management, to determine the direction in which commercial effort shall be made, and to provide that, with the co-operation of Labour, success will be reasonably assured.

Apart from the burning question of the actual division of profit between Labour and Capital, not to mention Management, profit must not only be made before it can be shared, but the absence of profit must sooner or later spell unemployment to Labour.

The lessons of standardisation and of specialisation, which are the corollaries of mass production, ought to have been learnt by all, and the great need always is to apply those lessons in making plans for the future and, not least, to have the courage of convictions.

The considerations necessary to enable the manufacturing policy of any existing works to be intelligently determined may be summed up as follows :

1. As to the product for which the factory and plant are efficiently applicable or can be made so, with due regard also to transport facilities and costs.
2. As to present trading conditions and possibilities in such product.
3. As to what extent standardisation will contribute towards conditions of mass production.
4. As to the extent to which specialisation on one or more suitable products will lower the costs of production and so make possible reduced selling prices and larger trade.
5. As to the financial requirements for carrying out any contemplated manufacturing policy.
 - (a) Experimental and Development Expenditure as to design of product and methods of manufacture.
 - (b) Additional Buildings and Plant.
 - (c) Tools, Gauges, Jigs and Fixings (in engineering trades).
 - (d) Raw Material Stocks.
 - (e) Current production expenditure—Material, wages, on-costs.
 - (f) Finished Stock.
 - (g) Publicity and Sales Promotion.

In the case of a new business being started, the considerations affecting the settlement of manufacturing policy will often be centred around certain patents which it is intended to exploit, though much the same conditions obtain without a patent, except as to a more or less assured trade advantage according to the commercial value of the patents.

**Choice of
Manufacturing
Policy.**

Before any decision is taken, even in respect to the site and lay-out of building and plant, experiment and investigation should have been made as to methods of manufacture and as to design in relation thereto. These initial stages are commonly carried through by a syndicate of a few interested persons who, in due course, promote a limited liability company for carrying on manufacture on an appropriate scale.

The problem of financing industry has been the subject of much discussion in industrial circles, and some steps have been taken towards establishing a trade bank here such as exists abroad, where a manufacturer, or a merchant, can get accommodation on the strength of his contracts or his production programme, apart from the security that his tangible assets may give. In this country, the established banks prefer to play for safety and to take few risks. Their enormously strong position has been built up on the efforts of the industrial and commercial community, and this should the more impel them to lend a helping hand to industry, especially to the smaller businesses which are the less able to obtain the support that the larger concerns are in a position to command. Their attitude safeguards existing capital but checks enterprise and also checks the replacement of that vast capital that was lost in the operations of the war.

Production cannot proceed without finance and if the banks, the repositories of the nation's remaining liquid wealth, are to refuse adequate encouragement to industry to tackle manufacturing on efficient lines, then the handicap may prove most disastrous in the immediate future.

The question of developing foreign trade by extending credit facilities to the foreign importer is one of obvious interest to the manufacturer. Banking facilities are being increasingly provided as between the exporter here and the importer abroad, so as to give the latter equal credit facilities with those he can usually obtain from other countries while maintaining the principle of payment to the exporter against bills of lading.

Any application of a manufacturing policy ought to have as its starting point the question of production efficiency.

**Production
Efficiency.**

Production efficiency may be summed up as producing the right goods at the right time, of the right quality and at the right price.

Production Efficiency.

Manufacturing policy determines what are the right goods and indeed the standard of rightness in every respect—production efficiency is the attainment of that standard and obviously calls for the highest technical and administrative skill possible. It calls for continuous critical analysis of every expenditure, in effort, time and money—in method, labour and material—with a view to eliminating all waste, if the best results are to be obtained.

p. 28.
p. 147.

The conditions most favourable to production efficiency are those of mass production, that is, continuity of each and every process or manufacturing operation over lengthy periods. The quantities necessary to meet this condition must obviously depend on the character of the processes and may be said to be most contingent on the shortest operation. Repetition properly conceived is synonymous with mass production but the term is usually too carelessly used without proper appreciation as to whether the repetition in view really allows continuous individual operations.

Sometimes the theory of mass production is adopted without the practice. The motor car industry has furnished numerous examples of this, the frequent—one might say incessant—changes of design nullifying much of the advantage that should lie in manufacturing in large or relatively large quantities.

Changes of so-called standard design, and consequent dislocation of production, may originate internally, or may be necessitated through the Sales Department accepting orders of special character.

It is rarely possible to lay down any hard and fast rule that the customer shall not be met in any particular. Considerable judgment is required to decide in what respect any latitude may be allowed in meeting a prospective customer's wishes. On this decision must rest a greater part of the manufacturing policy.

Many firms do not pretend to attempt mass production or indeed manufacturing on repetition lines at all. In their case each order is carried out specially to the customer's specification, and only a very limited efficiency in production can be attained. The efficiency may, however, be entirely satisfactory from a commercial point of view so long as the selling price obtained is appropriate to the conditions.

Despite the acceptance of customers' specifications, there may still be room for standardisation in certain details, so that a higher efficiency in that portion of the production may become possible—more particularly when a firm specialises in a class of product without adhering to a standard type.

The principle of mass production does not of itself necessitate a large works, as the essential point is continuity of process, and this

can obviously be as well attained with a small plant well chosen for its purpose as with a large plant. Continuity of process for each worker by favouring the growth of individual expertness can achieve efficiency in point of direct or prime costs of production, irrespective of the size of works. **Production Efficiency.**

Further it may be possible to establish continuity of individual processes throughout a works without being confined to the manufacture of only one article, so long as the conditions of specialisation apply to each article made, and this can hardly mean less than departmentalising according to the article produced. The auxiliary services of tool-room, millwrighting, stores, etc., are however more likely to be economically run if the whole of the manufacturing plant is devoted to one product rather than split up to deal with several products. •

While certain economical advantages may be expected from manufacturing on a large scale, it does not always follow that the costs per unit of product fall with the increased size of works, for the reason mainly that, when a business outgrows the personal supervision of the founder, the methods of administration and choice of management staff may fail to supply that keen attention to detail by which alone total production costs can be brought to the most favourable level.

There must inevitably be a considerable reaction on both commercial and administrative methods, arising out of unnatural growth under war time conditions, where the total cost of production has hardly had to be considered and where commercial expenses have been almost entirely avoided, not least in regard to the financial facilities afforded so readily by the Government.

There seems little doubt that the expansion forced by the war on most manufacturing businesses cannot be maintained for long with only a pre-war outlook as to manufacturing policy and methods of selling.

In many directions even before the war the position of industry showed that we were not holding our own in open competition. The United States of America and Germany were increasingly invading not only our foreign markets but also our home markets. Japan has now entered the field as a formidable world competitor.

That this is no over-statement of the case is brought out forcibly in a report¹ issued in 1918 by the Committee appointed by the Board of Trade to consider the position of the Engineering Trades after the War. The report covers a great deal of ground, but running through it is an acknowledgment of a lack of manufacturing efficiency in this country, the reflex of our faulty manufacturing policy.

¹ Cd. 5073, published by H.M. Stationery Office.

Production Efficiency.

The wide application of the conclusions of the report is clear from the considerable number of trades from which evidence was collected, viz :

Agricultural machinery.	Motor Cars and Commercial Motor Vehicles.
Aircraft.	Motor Cycles and Cycles.
Bearings, Ball and Roller.	Paper Machinery.
Boilers.	Pianos.
Boot and Shoe Machinery.	Printing Machinery.
Bridge and Constructional Work.	Pumping Machinery.
Engineers' Tools	Railway Rolling Stock.
Grain Milling Machinery.	Sanitary Engineering
Implements and Tools	Scientific Instruments.
Internal Combustion Engines.	Sewing Machinery.
Knitting Machinery.	Sugar Machinery.
Lawn Mowers.	Textile Machinery.
Locomotives.	Watches and Clocks.
Machine Tools.	Weighing Machinery
Mining Machinery.	Woodworking Machinery.

Production Programme.

p. 23.
p. 145.
p. 150.

The primary difficulty in arranging a production programme for regulating output is to satisfy the claims of customers for delivery, the sequence of orders received having little relation to the sequence of deliveries insisted on.

The Sales Department, when seeking an order, frequently feel called upon to make a promise of delivery, which it may be quite impossible for the Works to keep, without sacrificing attention to earlier orders

Occasions may arise when it will be deemed desirable, for strong reasons of policy, to give preferential delivery to some order over the orders already in hand, but the reaction on production efficiency is distinctly unfavourable and, for most works managers, distinctly discouraging.

Only reasons of high importance can justify radical changes in the production programme. Generally speaking, an order once started in the shops, as distinct from, merely obtaining all material in readiness, should be carried through to a finish.

After taking full advantage of all the possibilities of increased output that lie in the adoption of the most efficient machinery and methods and in the fullest co-operation of labour, the works manager has, after all, only a limited production capacity at his command. Every false start—for interruption of production to meet new requirements has that effect on the work interrupted—every false start is so much irrecoverable loss of the works capacity. The false start lies in the fact that the momentum that had been obtained on the interrupted work is lost and has to be recovered. The cost is not to be summed up merely by the wasted setting of machines, though this sometimes means a good deal, but mainly by the wasted setting of men's minds—managers, foremen and workers.

The best method of arranging delivery dates on a practicable and satisfactory basis from the points of view of both selling and production is for these matters to be investigated by the production estimator. His duties in ratefixing compel him to continuously study the capacity of the whole works and to acquire a skilled judgment in what can be done and also as to the side or auxiliary issues involved in each case. He can thus intelligently report not only as to delivery dates but also the probable labour costs, and the preparatory expenditure and time required before economical production could start.

Production Programme.

p. 39.
p. 111.
p. 139.

It may be necessary in some businesses to have regard to the value of the monthly turnover in arranging delivery dates, so that there shall be an adequate monthly delivery of finished goods which can be invoiced.

In all these connections, the question of output under stock production orders must be kept in mind, for their delivery dates call for equally skilled attention if sales are to be maintained and stimulated.

This aspect must also not be overlooked in the case of experimental work which may absorb the works production capacity to the detriment of promised deliveries. This particular difficulty can be avoided to much advantage when the experimental department, or model room, as it is sometimes called, can be quite separate from the ordinary manufacturing departments.

Manufacturing for stock occurs in most works, and usually where mass production obtains, substantially all the manufacturing will be for stock.

Whether little or much of the production is for stock, it is desirable to establish some system of control by which the stock production is sanctioned.

p. 520.

In the case of mass production, the sanctions should emanate from the board of directors or managing director, and this should be so when stock production comprises only a portion of the whole production.

All stock production, however seemingly trivial, should be sanctioned by the managing director, and no sanction ought to be given without a knowledge of the estimated cost. These sanctions will necessarily influence and in some cases entirely control the production programme.

F 10.

Stock production orders that are issued to keep the shops employed through a lull in sales requirements are apt to be treated purely as "stand-by" jobs and unless looked after closely will, undoubtedly, cost an excessive amount.

Production
Programme.

p. 309.

p. 522.

The question of providing a proper stock of spare parts touches a good many businesses, and much care is required to provide adequately in this direction without incurring bad stock.

The usual basis for ordering up spare parts is to take the consumption for repair purposes during some preceding period. This is all right for an established product, the design of which has not altered, but there will be frequently a need to make provision of spare parts with very little data to go on, other than experience with some similar product. In the tentative stages—and many businesses seem never to get past that stage in their stock production—it will be better economy to hold a fairly generous stock of spare parts in the unmachined stage, viz. as castings, forgings, stampings or bar, and only to machine to a finish in relatively small quantities, though this will inevitably mean increased costs and loss of output as a whole.

Another factor entering into the matter of stock production, more particularly of complete assembled product, is that of appropriation to sales orders.

This appropriation will quite frequently involve some modification to suit the particular customer, and where these modifications affect more than the final production stages, it is necessary to plan the stock production accordingly.

The scheme of widest application is to issue the stock production orders for assembled units or groups of parts according to the class of product and the probabilities of sales modifications.

F 101. These assembled units will represent the stage in which the product passes into stock to be drawn out later in various combinations of units to make complete products, in accordance with sales orders.

F 12 The duty of issuing official or office orders for work to be put in hand or goods to be despatched falls upon one of the commercial departments, either financial or sales, and convenience usually dictates the channel to be used.

p. 16
p. 22.
p. 320.

Orders as received from customers will be subject to scrutiny, first as to the credit status of the customer, and secondly, as to any technical or commercial conditions attaching to the order that require consideration.

It may be taken that in principle all production orders authorising work to be put in hand should be issued by the financial management as an instruction from the board of directors and that all sales orders disposing or instructing as to despatch of the product should be issued by the sales management, subject to confirmation by the financial management as to credit. Where production is only carried out to meet specific sales orders the issuing of official

orders must be centralised at one point—preferably under the **Production Programme** financial management.

Acknowledgment should be made if goods are not despatched the **F 13** same day.

Of these orders, some will refer to special products, others to standard product or to standard product that can be adapted to the customer's requirements.

The fact that standard products may be sold does not always imply that the goods will be either in stock or in course of manufacture, owing to the wide range of product attempted by many firms in this country.

Standard product that has to be made up for each selling order will require to be treated much the same as special products.

If all standard products are kept in stock, and if no sales of same are made that involve modification of standard design, then and then only will it be feasible to discriminate in the issue of official orders between sales of special product and sales of standard product.

In the ordinary way, the only division in sales that can be maintained in the official orders will be as between sales of complete product and sales of sundries (including repairs). These divisions may be designated as follows :

Series A—Sales Orders. (F 12)

„ *B—Sales Repairs and Sundries Orders. (F 51)*

In the latter series, in a business involving the supply of sundry spare parts, with or without the work of fitting same in place, it will be better, if not absolutely necessary, to group such orders in one series, though separation of *Sundries* from *Repairs* is well enough, if it can be carried out consistently.

A valuable point may be made in connection with sales repair orders, namely, that the customer should be given some close idea beforehand of the probable price, to obviate dissatisfaction afterwards as far as possible. It would be safer, of course, not to start the repair until the price is approved, but policy will prevent too arbitrary a position being taken up. A careful inspection of repairs necessary must precede the making up of any estimate which at the best can only be provisional, and such a course is to the advantage of all parties.

Where repairs arise on an article originally sold under a twelve months or other guarantee of free replacement of faulty parts, an agreement on each occasion beforehand as to the price to be paid for repairs not covered by the guarantee is very desirable, as customers have sometimes very vague ideas of the limitations of a guarantee of this sort.

p. 312.

p. 35.
p. 562.

Production Programme.

It will prove very helpful in controlling expenditure on guarantee work if a separate series of orders is used for this purpose. Instead of a separate series a qualifying letter may be given to the orders referring to guarantee, *e.g.* BG 690.

While the definition of what constitutes a sales order is obvious enough, the same can hardly be said of production orders.

- p. 442. Where product is made specially for each customer, the sales order may also be the production order, that is the order to which the cost of production is to be charged.

It is a common condition that some of the sales orders will be also production orders, in that the whole product called for in such cases has to be made specially, while the balance of sales can be effected from goods made nominally for stock.

- p. 320. Where sales orders are utilised as production orders it may be sufficient distinction to add a letter, say P, to the Sales Order No.

F 49. Thus Sales Order A1001 may be issued as Production Order AP 1001.

Some risk of confusion may possibly arise when a sales order is used as a production order for the assembling or erecting stages only of any product, but this can be avoided so long as the stock manufacturing orders are arranged so as to cover the work of production up to that stage when the sales orders come into operation for the final stages.

- p. 316. The progressive or identification no. of each item of complete product as it appears in a progressive no. register will often be a better reference for the concluding stages than the sales order no., as not being liable to cancellation or alteration. The cross reference in this register must be relied on to identify particular progressive nos. with particular sales order nos.

- p. 471. A subsidiary class of production orders will relate to development and experimental work. It is quite important that orders of this character should be authorised by the managing director, as tending to control a class of expenditure that so readily runs to excess, although much advantage may result from generous expenditure wisely directed. An expenditure limit may be placed on some of these orders, with a view to their being referred for further authorisation when the limit is reached.

The term developments has been associated with that of experiments to give a wider scope to this series. Such wider scope is valuable as providing a suitable heading for development expenditure, in connection with regular production, that would otherwise have to be included in the net production costs. The point has most application in a strictly manufacturing business and will arise, for the most part, on new lines of product.

Probably only an estimate of those production costs, that ought to be treated as developments, can be attempted, and in such cases an official order in the above series may hardly be of much use—the necessary adjustment being possibly made in the accounts. On the other hand, the total expenditure passing to the Development and Experiments Account in the financial books will be more susceptible to control if official orders are issued to cover even these estimated proportions of cost.

**Production
Programme.**
p. 580.

The order series for stock manufactures is assumed to be lettered "C" as C1237, and for developments and experiments to be lettered "D" as D372.

If the order forms for each series are specially printed, as may well be worth while in many businesses, the series numbers will more conveniently start from 1 in each series, thus A1, B1, C1, D1, but if one common order form is used convenience will lie with their being printed with one consecutive range of numbers only and for the qualifying letter to be boldly marked by means of a rubber stamp, as A1, B2, A3, A4, C5, D6 etc.

I B

STAFF ORGANISATION AND CONTROL.

Staff Requirements. STAFF organisation is essentially the arrangement of staff responsibilities or functions and before it is possible to intelligently consider what individuals are necessary for administering any industrial enterprise, the functions arising out of the adopted manufacturing policy require to be carefully weighed.

A manufacturing policy may fall in any category from mass production of standardised articles to what, for the sake of contrast, might be called jobbing work with every job different. Both extremes may be commercially possible though obviously only a microscopic proportion of works could be kept profitably employed on jobbing work, and to say the least, it is not for general acceptance as a manufacturing policy. Again, highly standardised production has its limitations and risks in that it means catering for a special market which may not necessarily be permanent, so that there is legitimate room for many phases of manufacturing policy between the two extremes given. The point of first importance is of course that there shall be a definite manufacturing policy of one kind or other and not the vacillation so detrimental to all hope of efficiency. Given the policy, it becomes feasible for each concern to determine the appropriate staff organisation that shall realise the best result possible under that policy.

In view of the infinite variety of conditions that may obtain in works it is only possible to discuss principles on very general lines.

The majority of industrial undertakings are limited companies, that is, limited under the Companies Acts as to the liabilities of the shareholders. All executive power is vested in the board of directors elected by the shareholders, and these powers are delegated according to circumstances to the various principal officers of the company.

There is commonly a managing director with supreme administrative control; apart from the board, or there may be a general manager in that capacity acting more directly under the chairman of

the board but without a seat on the board, though preferably always in attendance at board meetings. The managing director is sometimes chairman of the board as well. Various other arrangements are adopted, and in the case of a private firm, the partners carry out all the functions of a board of directors, as well as own the business.

There are obvious arguments in favour of directors having a specialised knowledge of the industry in question, while there are other arguments in favour of men possessing broad commercial experience.

In some cases the principal administrative officers of the company are also directors, and may be said to bring an invaluable practical experience to bear on the general policy of the company. As an alternative this experience can be made available by attendance, as required, at board meetings without any seat on the board. Sometimes officers standing in this relation to the board are termed technical directors, and this would seem to give a very desirable status to the heads of branch works of any relative magnitude.

With a view to improving relations with Labour, some companies have invited their workers to nominate a director on the board but without success. The refusal is quite understandable and it is altogether doubtful if the principle is sound. Labour can probably best meet its responsibilities as a partner in industry through the medium of a Works Co-ordination Committee on the lines discussed under Labour Administration, Section III.

p. 187.

The efficiency of boards of directors, as regards internal administration, may easily be the reflex of the efficiency of the managing director or alternatively of the general manager in regard to his use of the executive powers exercised by him on their behalf and under their directions. In any case the efficiency of the administration generally is not readily achieved by any board except through the officer mentioned, and personal interference by individual directors not having definite executive responsibilities can easily cause dissatisfaction and nullify what may be perfectly well intentioned effort.

There should be no doubt as to the responsibility of the management generally to the board, and the directors should so exercise their control that the efficiency of the management shall always be clear before them, and statistics on a skilfully devised system will materially help to this end. The directors should establish close contact as a board with all the responsible members of the management. Not one of the least advantages of such a course of action will be the necessity for directors to acquire an adequate appreciation of what constitutes administrative efficiency and an understanding of the consequences of wrong manufacturing policy and wrong choice of staff.

p. 63.
p. 355.

Staff Requirements.

Organisation and administration will however achieve little good unless the manufacturing policy is well defined and all arrangements directed to its adequate carrying out. While on the other hand it is possible, when the policy is exceptionally sound, such as mass production of an article that is easily marketable, for commercial success to result despite many faults of administration.

Frontispiece.

Executive control or *General Administration* will be found on examination to resolve itself into three main functions :

Financial Management,
Production Management,
Sales Management.

Financial Management

Financial management is so much the subject of detailed consideration by the board of directors that it is not the practice for any one official to be called financial manager. Under the Companies Acts it is necessary for each company to have a secretary who has certain legal responsibilities that do not attach to other staff officials. The duties arising out of these conditions, and his relations to the board are the subject of a literature of its own, and all that is called for here is to lead to the point that these secretarial duties are so largely associated with finance that the secretary comes to act commonly as financial manager under the detailed instructions of the board.

p. 10.

p. 19.

p. 588.

p. 18.

P. 42.

As secretary, and as financial manager in varying degree, he naturally has to deal with general correspondence, preferably confining his personal attention to those letters which do not pertain to either production or sales, unless he also has responsibilities under either or both those heads—certainly not at all unusual in the case of sales. There is often an overlapping into production management when buying of material for the works is held to be a matter of financial management. The overlapping may be imperative but the view taken is that, in principle, buying for the works ought to be within the capacity of the works manager or the general works manager, to give him a title more commensurate with the wide commercial responsibilities here suggested.

A more obvious feature of financial management is the payments of accounts and wages and the collection of monies owing, including in that the preparation of sales invoices. A corollary of this is the keeping of the financial accounts generally. With the larger firms it may be necessary for the secretary to delegate the actual cash handling to a cashier, while an accountant may be appointed to keep the financial accounts, with responsibility directed to the secretary or to the managing director, according to circumstances,

but more usually to the secretary. Accountancy may be associated with the position of registrar, an official appointed when necessary to relieve the secretary in the keeping of the register of shareholders, and to conduct the transfer of shares and all related business.

There is one phase of accounting which it is considered more properly belongs to production management than financial management namely works or factory accounting, covering in that term the basic administrative records of labour, material and plant and their embodiment in cost accounts. In the absence of a better understanding of the principles and applications of cost accounts by technical managers, it is inevitable that cost accounts should come more usually than not in the category of financial management. With the wider education of those technically responsible for production this common fault and weakness in administrative organisation will be corrected, though it comes much too slowly.

The ordinary functions of financial management may be set out as follows :

Secretarial Company Duties.
General Correspondence.
Financial Accounts.
Payments and Collections.
Official Orders authorising production.

**Financial
Management**

p. 333.
p. 435.

The second main element or division of general administration is production management.

**Production
Management**

To a great extent, production management is synonymous with works management, but the field of works management as ordinarily understood stops short of a proper responsibility for all aspects of production management. There are at least two functions of production management which are often held to be outside the province of works manager, owing to their commercial character, viz., buying and works accounting, but this attitude neglects the equally essential technical character of these questions for the handling of which the works manager alone is likely to be qualified.

p. 276
p. 435.
p. 588.

Sometimes, for nearly opposite reasoning, design is considered as calling for a more scientific training than the works manager usually has and the chief designer is accordingly given independent authority. The danger of this course is that the requirements of economical production are apt to be inadequately appreciated in the drawing office, whereas with the works manager responsible for the passing of all designs this issue could be thoroughly threshed out beforehand and full advantage taken of the practical resources

**Production
Management.**

p. 38.
p. 111.

of the works staff, such as the foremen of pattern shop, tool room and machine shop, and not least, the production estimator and ratefixer, providing his functions and abilities are on the plane that is recommended further on.

This leads to another question, viz., the preparation of estimates, whether for special contracts or stock manufacturing propositions. The works manager ought, in principle, to be the best qualified to supervise the preparation of detail estimates so long, of course, as he is adequately supported with a qualified production estimator, who can go into every process and operation necessary to produce a given article and compute the time really necessary. Such an assistant by specialising in this field can prove of the greatest value in intelligently forecasting delivery dates. It is usually most convenient for material estimates to be prepared in the drawing office. The application of these estimates to the construction of

F 11. a tender or selling price is clearly a function of sales management.

Tender and selling price are practically synonymous terms but a tender is usually understood to apply to a special contract that is to a particular specification of work, while a selling price more often refers to standardised lines, which can be listed in a catalogue.

p. 16.
p. 280.

Turning to buying, the works manager who has nearly unfettered control in expending wages is not always considered a suitable person to buy material. It would be easy to establish the reasons for this attitude and in some businesses where material expenditure bulks largely, the question of buying—certainly of forward contracts—is so important as to be dealt with by the board of directors. That this should be so does not take buying out of the field of production management but reduces the position of buyer to that of buying clerk. Unfortunately in practice a clerk is often promoted to be buyer and although, perhaps, generally responsible to the financial management, exercises a good deal of discrimination on his own initiative which may be detrimental to true economy in production.

Buying in properly trained hands can be a far reaching factor in manufacturing efficiency by its influence on production control and costs.

There may seem to be good enough local reasons for buying to be placed in the hands of a clerk, but this course does not make usually for efficiency. A capable clerk can of course do useful work in learning the sources of supply and obtaining competitive quotations.

The art of buying involves more than an acquaintance with trade commercial practice. It should include an intimate knowledge of trade processes and alternatives together with a keen outlook for demonstrated technical possibilities.

In all engineering businesses and also in some others, there is a need for close co-ordination between buying and designing, and this is more likely to be ensured when under the one control.

**Production
Management.**

Works accounting is a vital element in efficient production management, and can be resolved into two divisions of administrative records and cost accounts. The accountancy knowledge that is called for has been too highly rated by works managers and they have too little understood the fact that cost accounting is no more than the expression or application in monetary terms of the administrative records. They are confused by the conventions of bookkeeping—which can however be all brushed on one side. It has been the ambition of the author to assist materially in freeing cost accounting from the technicalities of bookkeeping and to demonstrate to the works manager that in this direction, where he can be so immeasurably helped in his daily work, he should have the very little courage necessary for facing the problem for himself.

p. 333.
p. 435.

A works accounting system, in its entirety, is a stewardship of the entire works expenditure. The works manager is responsible for applying every shilling of wages and material expenditure to useful purpose and yet more often than not looks on at a distance at the books of accounts wherein his stewardship may or may not be adequately rendered in terms of £. s. d. This point is not, however, the most important—what matters most is that the works manager does not get that administrative advantage from the works accounting system that, not merely he should be glad to get, but which the board of directors, did they but realise the position, would insist that he did get in the interests of economical working.

Administrative records of labour, material and plant are obviously features of everyday works management, and no question arises in the average works manager's mind as to his responsibility and interest so far, but he seems to be willing to retire defeated when it comes to applying these basic records to the purpose of a cost system. It must be admitted that the financial accounting systems approved by professional accountants do not always favour the establishment of a separate system of cost accounts and the consequent method of interlocking cost accounts with the financial accounts is not very simple. The author entirely concurs that cost accounts ought to interlock in this way and the difficulties are all dissolved by having a self-contained cost accounting system instead of trying to make the financial accounting system cover cost accounting as well. It is a special feature of the present work that the cost system is shewn clear of the financial accounts. The cost

p. 567.

**Production
Management.**

returns embodying the results of the cost system should be subject to audit by the financial management. The works accountant, while controlled generally by the works manager, should be subject, as to his standard of accountancy, to the financial accountant. This would meet the difficulty of the works manager's inevitable lack of accountancy training.

An independent cost accounting system does not destroy the comprehensiveness of the financial accounting system and does not entail any sacrifice of the accepted principles of accounting called for under the Companies Acts or of that high standard which professional accountants have, to their credit, established in this country above all others.

When the works manager moves to take up these fuller responsibilities he will in most cases find his proposal warmly welcomed by the professional accountant who has been appealing for greater interest from the technical manager. The accountant has gone as far as he has in installing cost systems only because, otherwise, the work would not have been done at all.

Arising out of these various considerations, the recommendation is made that the works manager should hold the position of *general works manager* with such staff as may be necessary to efficiently carry out the following range of functions pertaining to production management :—

Production Control.

Labour Administration.

Material Control.

Works Accounting { Administrative Records,
Cost Accounts.

Relatively few works managers are experts in management by training and accordingly success in management varies on more grounds than that of temperament.

The real ability of some is hidden through a faulty manufacturing policy, not of their choosing, while others are singularly fortunate in having to execute a highly favourable manufacturing policy.

Works management affords scope for many natural qualities amongst which may be specially mentioned strength of character coupled with a sense of proportion—perhaps a sense of humour would express it better were the word not so likely to be misunderstood. Out of these qualities can come the ability to lead. No longer is effective management to be accomplished by the mere arbitrary use of authority and, accordingly, the more need is there for managers to hold their position by merit and large knowledge rather than to rely on the continuance of fortuitous circumstances—

the more need therefore for a thorough understanding of the principles of industrial administration. **Production Management**

Granted all these possibilities in the way of administrative control, due consideration must be given to the outstanding necessity for the works manager to have the natural ability to handle men, both workmen and foremen. Without this ability, which is hardly to be acquired by merely taking thought or by any mechanism of administrative organisation, all efficiency in other directions may be brought to nought.

The fact that this psychological judgment is called for in only lesser degree from foremen, suggests that a works manager ought to have proved his ability as a foreman or at least as a works superintendent, with immediate charge of foremen and workers, before taking the higher position. p. 159.

Sales management, the third and last main division of general administration—the commercial aspect of manufacturing—is not always considered at its proper value. **Sales Management**

At first sight, sales management may seem to call for far less training than either financial or production management and this view has contributed no doubt to the casual way in which selling is tackled in many cases. p. 28.

The understanding of markets calls for the highest degree of commercial knowledge coupled with appropriate technical or trade knowledge, and a sales manager of adequate training and experience can do something more than sell the product—he can materially assist in formulating the manufacturing policy that shall make selling both easier and more extensive. p. 588.

Without attempting any full consideration of the avenues along which sales management should take action to foster business, there need be no hesitation in emphasising the need for specialisation in the field. It is an expensive matter to exploit markets single handed and most wasteful competition has occurred for lack of co-operation, and still occurs. There are, however, noted tendencies now towards the pooling of interests thus enabling a more efficient and withal very much more economical cultivation of markets. This co-operation must alter the functions of sales management within the individual firm but does not affect the consideration of principle.

There are now well defined movements in progress towards co-ordinating the interests of sellers in foreign markets and financial facilities are being extended to enable credit to be given, where necessary, to meet the competition of other nations on more equal footing. Consular appointments are being filled

**Sales
Management**

by men of more commercial experience and understanding of trade conditions and although our consular service may never go the length of existing only as trade feeders to the home country, still undoubtedly there is prospect of more alertness in cultivating our commercial interests.

- p. 320. There is a further comparatively minor function of sales management, referred to on page 10, viz., the issue of official orders to the works as to product sold. Arising out of sales effected comes the question of despatch and shipment. This work should be authorised by the sales manager but it is commonly considered as an element of general correspondence under the financial management. In any case all despatches from the works, whether for home or abroad, must be advised to the financial department for purposes of invoicing.
- p. 324. F 12.
- F 113.

The functions of sales management can be analysed under the following headings —

- Publicity.
- Sales Promotion.
- Specifications.
- Commercial Estimates and Tenders.
- Sales Orders and Instructions for Despatch.

**Staff
Diagram.**

A diagram is given as a frontispiece to show graphically the conception of staff organisation and functions which has been described. There is of course the danger that a diagram may be taken by some readers as an attempt to dogmatise as to what staff is necessary for all businesses. A little thought will show how impossible it is to offer a general solution of a problem that differs in different works as much as the personality of their respective managing directors. On the other hand it is necessary to give some representative embodiment of the principles set forth and a diagram is particularly helpful in obviating too detailed a discussion at this stage of the various ramifications of administration. Cross references to those parts of the book in which the various functions and officials are further considered will be found through the medium of the table of contents, glossary and index.

p. 588.

It will be noted in the diagram that the post of general manager does not appear. The duties of a general manager are dependent very largely on the personality and abilities of the managing director on the one hand and the works manager on the other. In not a few cases the general manager is necessary to make good the administrative deficiencies of the managing director and the commercial deficiencies of the works manager. There may, of course, be other grounds for the managing director's functions being dele-

gated to the general manager. When there are several works under the one managing director, the general manager of each works may act very much as a deputy managing director, or it may be that the branch manager would occupy, on the diagram, the place of general works manager. No sort of ruling can be laid down. The feature of the diagram is, of course, the wider sphere allotted to the general works manager and the inferred need for better training accordingly.

The works accountant is shown as directly responsible to the general works manager but inasmuch as the cost accounts will be subject to accountancy control and audit by the financial accountant, a dotted line of semi- or indirect responsibility is shown to the latter. The works accountant is therefore the link between production management and financial management.

A most valuable development of modern administrative methods is the institution of staff committees.

It is necessary to have a strong chairman of each committee and preferably one capable secretary to serve on all committees, so as to better co-ordinate their work.

The following are instances of staff committees :

Sales Committee—under Sales Manager.

Chief Designer, Production Estimator and Salesmen. The salesmen state points F 43. p. 8.
against the firm's product that they have to deal with when out selling. p. 32.
Selling programme adapted to works production programme and schedules of future deliveries drawn up and adopted.

Purchases Committee—under General Works Manager.

Secretary and Buyer. Interim orders confirmed and more important buying settled. F 15. p. 280
Contracts for supplies prepared

Production Committee—under General Works Manager.

Chief Designer, Production Estimator, Production Regulator and Principal Foreman. p. 8.
Position of orders gone into. Overtime requirements settled. Production p. 146.
programme agreed. F 52 p. 357.

Tool Committee—under General Works Manager.

Chief Designer, Tool Designer, Production Estimator and Inspector. (Foreman Tool p. 139.
Maker and Foreman Patternmaker attend when requested)
Provision of patterns, jigs and tools discussed. Drawings of jigs and special F 58.
tools approved. Discussion of plant efficiency.

The selection of staff obviously calls for the utmost care, particularly as staff appointments should carry with them a sense of reasonable security of employment.

The fear of unemployment is a very real factor in sapping initiative, and this fear is intensified by the attitude of many prospective employers towards applicants who are out of employment. There are employers who immediately discharge any member of the staff known to apply for a berth elsewhere, so that it takes a rare courage for some men to find the niche to which they are best suited.

Staff Selection and Control.

In selecting new men consideration must needs be given to the strength of character of the applicant, and a clean bill of good behaviour is, in a measure, only a negative virtue. The real virtues from which the staff derives its strength are positive ones of initiative, ability and loyalty.

Loyalty is the key to staff efficiency, and requires to be assiduously fostered by consistent fair play. Want of care in selecting new staff and want of courage in weeding out obviously inefficient staff seriously militate against the proper spirit of loyalty.

Applications for staff employment should be set out on a prescribed form to ensure full details being supplied and to allow of fair comparison.

Junior help may with great advantage be subjected to some simple form of competitive examination, and there should be in operation a definite scale of pay while on junior duties.

p. 240.

While an apprenticeship scheme in the ordinary sense is rarely applied to staff duties, yet every junior, whether boy or girl, should be considered as a learner, to whom advancement of work is as important as advancement of pay. The proper selection and careful training of juniors will not only result in better material for the adult positions and stronger loyalty, but is an elementary duty of the employer to the community.

p. 177.
p. 209.

The management should give facilities for staff clubs for mess purposes, recreation and instruction. In the last connection journal clubs for the interchange of various appropriate trade and technical journals and also of suitable books will tend to create greater interest in the industry in which the staff are engaged.

Staff pay must take cognisance of the quality of work done as well as the quantity. If an employer for lack of opportunity cannot give adequate promotion in position, work, or pay, where it is merited, he ought to be willing to allow any such man to try for larger opportunities elsewhere rather than, in a tyrannical spirit, expect to be able to stand permanently in the man's light. The risk of losing good men must be met by having sufficient good men on the staff in training, and adequate stimulus may discover enough good men among the rank and file.

The organisation and consequent recognition of each man's duties make for discrimination as to individual merits, and lessen the disadvantages of staff changes and absences.

The plan of occasionally changing duties round, so that more than one man may be familiar with each duty, is quite sound, and forces the establishment of a carefully organised routine that will not easily suffer in occasionally fresh hands.

Coming to the question of departmental heads or administrative officers, the spirit of the management in its intention to deal with the staff may be rendered wholly abortive if the departmental head is petty minded. There are men in position occasionally whose instinct of self-preservation induces them to discourage any initiative in their assistants, and at the worst to take credit that may belong more properly to the men under them.

This instinct is not unnatural, but its operation can at least be largely obviated by taking care to appoint only men to office whose merits have legitimately won recognition and whose reputation as to ability is established on firm ground, and also by taking steps to give a sense of security to each appointment to a greater degree than may be possible with the less responsible staff. To this end the interests of departmental heads cannot be too closely identified with those of the company. This can best be done by a bonus calculated on the profits of the year. In some cases bonus is paid quarterly to all the staff on the estimated profits and adjusted at the end of the year. Experience shows this plan to produce very good results amongst the general staff, but not so good with the works staff, other than the stores.

Staff Selection
and Control

p. 163.
p. 231.

The following is a specimen of a staff agreement. The length of engagement is usually for a minimum of three years, which is perhaps as long as can be wisely undertaken by either party.

Staff
Agreement.
F 1.

MEMORANDUM OF AGREEMENT made the _____ day of _____ One thousand nine hundred and _____ BETWEEN _____ In the County of _____ whose registered office is situate at _____ of the one part and of _____ (hereinafter called "the Company") in the County of _____ (hereinafter called "the Officer") of the other part.

WHEREBY IT IS AGREED as follows :—

1. The Company hereby engage the said Officer to be on the staff of the Company and to hold the appointment mentioned in the Schedule hereto. As the holder of such appointment the said Officer shall perform the duties and exercise the powers which from time to time may be assigned to or vested in him by the Directors of the Company, short particulars of such duties being set out in the Schedule hereto.

2. Subject as hereinafter provided the said Officer shall hold the said appointment for the term of _____ years from the date mentioned in the Schedule hereto. During the said term the said Officer shall, unless prevented by ill health, devote the whole of his time, attention and abilities to the business of the Company and shall obey all the lawful orders and instructions from time to time of the Board of Directors of the Company, and in all respects conform to and comply with the directions and regulations given and made by them, and shall well and faithfully serve the Company and use his utmost endeavour to promote the interests thereof.

3. The said Officer shall be entitled to such reasonable holidays as may from time to time be agreed upon between him and the Company or the Directors thereof.

4. The said Officer shall not divulge or communicate to any person or persons any information which he may receive or obtain in relation to the business affairs of the Company or the working of any invention or process which is carried on or used in the Company's works, and will at all times afford to the Directors and all other persons entitled to demand the same full explanations as far as may be in his power of all matters affecting the Company connected with his said appointment.

5. Whilst the said Officer shall continue in the employment of the Company, he shall not carry on, or be concerned in the carrying on of, or in any way be interested (except as a Shareholder or Debenture holder) in any business other than that of the Company, without the consent of the Directors of the Company in writing.

6. The said Officer shall be entitled to the salary mentioned in the Schedule hereto, such salary being payable monthly, and in addition to such salary he shall be entitled to payment, in respect of each financial year of the Company, of a percentage on the dividend declared on the preference and ordinary Shares of the Company in such financial year as mentioned in the

**Staff
Agreement.**

Schedule hereto. Such percentage shall be payable at the same time as the final dividend for each financial year shall be distributed among the Shareholders of the Company, and in respect of the financial year ending on the Thirty-first day of December next the said Officer shall be entitled to a proportionate part of such percentage or share of profits calculated from the date of this Agreement. If this Agreement terminates before the end of any financial year, or for any reason (except those set out in the last part of clause 8) the Officer leaves before the end of such year, the Company shall pay him, at the same time as the final dividend for that year is distributed, a proportion of his said percentage calculated from the First day of January preceding the termination of this Agreement.

7. Either of the parties hereto may terminate this Agreement and the engagement of the said Officer at any time after the expiration of the said period of his appointment by sending to the other of them at the last known place of abode or business of such other party calendar months notice in writing, and at the expiration of such notice this Agreement and the said engagement shall determine, but until so determined this Agreement shall continue in full force.

8. If by reason of ill health, accident or otherwise the said Officer shall be incapacitated from attending to business for three calendar months consecutively, the Company shall be entitled to discharge the said Officer provided such incapacity shall not have arisen from injury or accident received in the service of the Company. If the said Officer shall at any time wilfully neglect or refuse to perform any of the duties undertaken by or devolving upon him under the terms of this Agreement, it shall be lawful for the Company immediately to terminate the engagement of the said Officer without any previous notice.

9. If the said Officer shall be required by the Directors of the Company to remain out of Great Britain for any lengthened period on the Company's business the said Officer shall be entitled to receive additional remuneration in respect thereof.

10. Any special terms or conditions mentioned in the Schedule hereto or endorsed on this Agreement and signed by the said Officer and by two of the Directors of the Company shall be read and construed as part of this Agreement.

AS WITNESS the hands of two of the Directors of the Company on behalf of the Company and of the said Officer

Witness to the signature of _____ and }
two of the Directors of the Company }
Witness to the signature of _____ }

THE SCHEDULE ABOVE REFERRED TO.

BRANCH—
APPOINTMENT .
DUTIES GENERALLY -
SALARY—
PERCENTAGE ON DIVIDENDS DECLARED (IF ANY)—
SPECIAL CONDITIONS (IF ANY)
DATE OF COMMENCEMENT OF APPOINTMENT—
REMARKS -

**Staff
Regulations.**

p. 57.
p. 262.
p. 283.

Some questions may arise as to staff regulations, and it is desirable in fairness to have these settled and applied to all grades alike, with the possible exception of the principal officers.

Attendance should be recorded on arrival in the morning and on leaving at night. It is rather a matter of sentiment as to the use or otherwise of a mechanical time recorder. If any such recorder is used at all, it should be of the signature type and be absolutely fraud-proof. For small staffs under ordinary supervision an attendance book, in which each member of the staff signs, is sufficient.

In the matter of overtime, this at least should not be at the expense of punctuality in the morning. As to payment for overtime, theoretically it may be uncalled for if the staff are paid for holidays and absence through sickness, but in practice some recognition strengthens the hand of the head of a department to meet emergencies, and be always up to date with the work. A monthly award will sometimes meet the case, having due regard to punctuality and attendance. Tea may reasonably be provided by the firm whether any overtime bonus is paid or not.

Overtime in the drawing office is now often paid strictly at the ^{Staff} average hourly rate. ~~Regulations.~~

No overtime bonus should be considered for the head of a department, as he should have no interest in encouraging overtime.

Smoking should not be permitted to the staff unless the privilege is conceded equally to all employees, although smoking may interfere less with clerical duties than manual or machine duties. The not uncommon practice of smoking during overtime being permitted in the office and prohibited in the works creates a feeling of unfairness which is undesirable. Sometimes the position is aggravated by the works staff being forbidden to smoke because they necessarily work in or near the shops while the general office staff whose responsibilities are not always greater, are allowed to smoke.

Apart from a record of attendance it is desirable, under most conditions, though not usually done, to have each departmental head furnish a weekly staff report showing the allocation of the time of the staff. This has a useful disciplinary effect all round and allows of more careful dissection of expenses. In the case of the drawing office, particularly, it is essential for correctly charging to production orders.

I c

SALES MANAGEMENT AND ESTIMATES

Selling Policy. THE reaction of manufacturing policy on selling, policy must obviously be very marked the more specialisation and mass production principles are adopted.

Instead of a variety of products to be disposed of in a relatively small circle of customers there will be a correspondingly large volume of particular articles to be sold. This will usually require a much wider market, though that does not necessarily constitute a difficulty if selling prices are favourable, as is to be supposed will follow from the greater economy in costs of production.

Consideration of profit will have to be judged in the light of total profit as the year's trading and not necessarily on the profit per article sold, or even the percentage of profit on sales.

p. 6.

More rapid output, as follows from mass production principles properly applied, gives the opportunity for more frequent turnover of capital and multiplies profit accordingly. It is this multiplication of profit that offers such great inducement to manufacture rapidly. Rapid production not only reduces production cost per article but may warrant a lower percentage of profit on each sale because of the greater number of sales. Selling prices stand to fall therefore from these two causes, while at the same time total trading profits can rise. Against this must be set the consideration of expenditure necessary to find the markets for the greater volume of output, and herein lies a call for more skilled attention of manufacturers to the vital problem of selling.

Publicity. The art of publicity contains a psychological element which is very real, whether it be considered as a question of becoming known to the public or convincing the public as to the desirability of purchasing the goods offered. Advertising, as perhaps more ordinarily understood, is associated with advertisements in periodicals, and it is convenient to adopt the wider term of publicity so as to cover every possible means of reaching the public. By public here is

meant, of course, that portion of it whomay be considered as prospective customers or able to influence custom, as in the case of managers and buyers.

The channels, or media, through which publicity may be effected are numerous, and a few may be indicated :

Advertisement Literature (Catalogues, Occasional and Monthly Circulars, House Journals, Photographs, Calendars and the like).

Exhibitions.

Cinematograph Displays.

Public Trials and Tests.

Calls by Commercial Travellers (or agents).

Advertisements in Periodicals and other Publications.

Insertions in Directories and Buyers' Lists.

Advertisements in Public Places.

Loans of Models to Public Institutions and Schools.

References in the Press. Description of works consequent on visits by public associations.

Personal prominence, in technical or commercial matters, of the principals of the Company.

Lectures and contributions to the press by members of the staff.

The control of publicity expenditure requires the exercise of perhaps more discretion than any other class of expenditure.

The difficulty lies in knowing the real value of each medium used. No expenditure on publicity is perhaps wasted altogether, but there may be a world of difference in the benefits derived from different media.

If the medium used does not reach the right public, no brilliance, in regard to the form of literature or advertisement, can remedy matters. Sometimes the medium used may be right, but the appeal does not influence the public for want of forcefulness.

The public must learn to mentally associate the name of the firm with the goods advertised, and conversely the ideal position is that any mention of such goods shall suggest the name of the firm—not that that sums up the whole art, because advertising has to stimulate the public to the point of buying the goods offered.

There is usually a reluctance to send enquiries to unfamiliar firms, and correspondence in these days is so heavy that a limit is apt to be set in the number of enquiries that can be sent out, and this limit may be reached with the few firms best known to the buyer.

This matter of familiarity enters into the consideration accorded

Publicity.

to a firm's catalogue, not perhaps as to its safe custody but as to the extent it is used.

A thoroughly well prepared catalogue, designed to help the purchaser to decide his requirements and make his selection, is likely to win its position as a book of reference. It must always be borne in mind, however, that a meritorious catalogue may not be in evidence at the right moment to influence business, and the essential position to be in is so to advertise that the buyer can hardly fail to remember your name when he is interested in your class of goods. Your catalogue will then be referred to.

Touching again on the matter of controlling publicity expenditure, it is perhaps the best plan for the directors to annually sanction a total prospective expenditure based on a proper report from the sales manager. This total may advantageously include every kind of charge that is included in the accounts under the heading of publicity.

The rate at which this appropriation is taken up and the directions in which it is applied must be left largely, perhaps wholly, to the sales manager.

There are trade papers of sorts who offer "puffs" conditional on the purchase of a certain number of copies of the particular issue, but the value of notices in such periodicals is hardly likely to be worth much. The more reputable trade papers do not insert "puffs" of flagrant character, but none the less, welcome well written and illustrated articles describing the latest models and improvements, if legitimately described. Trained journalists are sometimes employed for this work, just as trained advertising specialists are employed for preparing advertisements.

The keying of advertisements, such as asking the public to address Dept. M., etc., is generally admitted to be of little use. If a particular line of produce is advertised exclusively in one journal for a definite period, some results can be traced, but this may be at the cost of neglecting more profitable media meantime. Ordinarily one has to rely on the indications, usually given by a proportion of those who make enquiries, as to the particular journal in which the advertisement was seen.

Most journals supply voucher copies of each issue containing a displayed advertisement. The advertisements in question require to be separately mounted on uniform size sheets adapted for classifying and filing in loose leaf binder. Press notices should be also kept in a suitable guard book.

An accurate register of blocks is also very necessary. The register may be in card or loose leaf form—a pull or impression being the essential record in each case. Each block should be

numbered and recorded in a book register under catalogue or class **Publicity**. —the block number and firm's name being stamped on the side of the block and electros.

The records may include specimens of illustrations from the firm's electros in traders' catalogues.

Every detail of publicity work must be carefully organised so that the sales department shall be able to disseminate improved and new copy with precision and without overlapping.

The alertness of this department may be stimulated by the offer of prizes for publicity suggestions from any member of the staff or any department.

A point may be made as to the good use that can be made of photographs, particularly if they are sent out mounted.

Sales promotion is a matter upon which much has been written, **Sales Promotion** and the virtues of follow up systems are kept in evidence by the **F 8** card index dealers.

When a firm is interested enough to make a first enquiry, it is undoubtedly good policy to follow the matter up.

Preferrably a traveller should call if only to report to headquarters the apparent status of the firm, although for information of that character an enquiry through one of the mercantile offices may be sometimes the cheaper way, and the information may be useful later, in regard to giving credit, should an order result. In more important cases confidential information may be obtained through one's bankers.

If possible, every legitimate excuse for calling on a firm should be taken advantage of. This may lead to friendly relations, but too great persistence obviously annoys and defeats its own ends.

Follow up work should be done in addition to calling, but not to excess. If a firm have shown their interest enough to make an enquiry or write for a list, they should be included ever after in any sales promoting campaign as more likely to become customers than those who have never enquired.

If business is to eventuate, steps require to be taken to ensure getting successive enquiries and the expense and trouble of follow-up work are likely ultimately to be fully justified in the majority of cases.

The issue of special bulletins, as they are called in the United States, at stated periods tends to stimulate interest that undated circular matter does not. The bulletins should, if possible, be personally addressed to a responsible officer of the firm. Some firms send out monthly lists showing the deliveries that can be offered of their various lines.

**Sales
Promotion.**

In regard to literature, its quality in every sense should be such as to infer high quality also in the goods offered.

Local conditions must regulate entirely the extent to which the efficiency of various follow-up moves shall be analysed and results summarised. Sufficient recording ought to be done to provide the sales manager with some data on which to justify the expense entailed. A general increase in sales may be due to other causes than sales promotion efforts, just as a general decrease may not always be fairly laid to the charge of inefficient sales promotion.

It is a very unsafe line of reasoning to assume that a successful year or years of trading confirms the efficiency of all the steps taken in good intention towards that end.

Unceasing critical analysis is the spirit of commercial efficiency no less than of production efficiency.

p. 33.

The education of the firm's travellers or salesmen so that they shall most effectually promote sales, and work in close co-operation with headquarters, is a matter that each sales manager needs to arrange for. This aspect is touched on in connection with the discussion on staff committees, where reference is made to a Sales Committee of which the salesmen are members, and meet the firm's chief designer to thrash out the arguments for and against the company's products.

The cinematograph is being used to educate travellers in their work, and to interest the public in the character and scope of the firm's work.

Salesmen's reports should be sent in daily for every call made. If a separate sheet or card is used for each firm visited, these can be filled and utilised for sales promotion work more readily.

Each salesman's programme should be known in advance at the head office, and to a very large extent, perhaps wholly, regulated from there. Advance knowledge is necessary, if proper attention is to be given to enquiries without dislocating the salesman's work.

The salesman should report each night his return address for the next day, and the day following. The report form should indicate this necessity.

Selling Prices.
p. 38.

Selling prices are necessarily determined on one of three bases or on a combination of them.

Trade practice.

Cost.

Estimate.

In the case of monopolies, whether arising from patents or trusts,

the basis of selling prices is naturally some reflection of trade practice, **Selling Prices.** although the commercial position may allow arbitrary prices to be fixed for a time.

For the manufacturer trade practice in fixing selling prices may be a most delusive guide in so far as it is the result of conventional estimate as distinct from analytical estimate. The printing trades furnish a glaring case of the fallacy of trade practice based for long years on conventional estimate without any attempt to investigate cost, resulting consequently in hazardous and unsatisfactory trading. With the adoption of a uniform and analytical system of costing in this trade, standard process rates are determined for estimating purposes by each printer that cover his costs and ensure a profit at the end of the year. Obviously to this statement must be added the proviso that he must accomplish his work in the estimated time, and to say that is to touch on the vital point in **F.R.** all considerations of estimates.

There is some advance towards commercial safety in using costs as the basis of selling prices, providing only that the costs are arrived at with any near approach to accuracy—a condition not always remembered or understood. Commonly enough prime costs are kept with some care, perhaps even scrupulous care, and then a conventional amount or percentage of oncost added that ignores the real circumstances of manufacturing expense obtaining with the particular product. This is a wide-spread form of self deception which has undoubtedly barred the way with many firms to a critical examination of manufacturing policy, through the cost accounts not indicating sharply enough the differences in production costs of the various products and not showing the true relation of final costs, that is, production costs inclusive of commercial oncosts, to selling prices. The practice of indiscriminately applying oncosts as a “blanket” charge averaged over the entire product is in many industries a trade practice and its fallacy has therefore not been obvious in the home market, and failure to command the export market has been put down to other reasons. The penalty has materialised at home when the “blend” of business has altered and more wide awake rivals have broken away from convention and picked up the trade in articles for which conventionally established prices give a bigger margin of profit.

For purposes of discussion it is convenient to consider as a contract any work undertaken to a special order and specification as distinct from mass production of standardised lines of product. It is of course possible for a contract to be so large as to provide conditions of mass production as in the case of many munitions contracts, but in the ordinary way, mass production only arises

Selling Prices. out of a firm's own manufacturing policy. In the case of a "contract" business, and it need not be engineering by any means, it is inevitable that a selling price has to be determined for each prospective job, and this price is tendered to the enquirer. The
p. 111.

F 11 preparation of these *tenders* will in some businesses require what may be called a commercial estimating department to distinguish it from a technical or production estimating department of which more is said in Section II D.

Sometimes the works manager will "size up" a proposed contract and give an approximate figure, which may be something better than guessing, but will be something worse than knowing.

A more ordinary alternative is for a draughtsman to get out the quantities of materials and then to collect opinions, frequently at short notice, from the various foremen as to labour costs. The
F 14 buyer will usually have to obtain the required quotations for special materials. There is no absolute reason why a foreman should not be able to estimate closely, but he obviously has little opportunity for collecting cost or other data, and if he attends to his essential duties as foreman has no opportunity of acquiring a skilled judgment in the finer issues of estimating. It is not therefore reasonable to look to him for more than rough estimates.

For standardised product, or product not made specially under a contract but manufactured in the first instance for stock, there will not be the procedure of a tender in the "contract" sense, but a *quotation* will be sent naming a standard price, less some discount possibly, according to the conditions of the sale under consideration. There are no great differences in principle between the proper
F 9 method of estimating for "contracts" and estimating for standardised products. The main difference with standardised products is the prolonged application of a selling price.

In considering the possibilities of estimating, due regard must be paid to the trade conditions regulating the fixing of selling prices. If selling prices are arbitrary, a rough estimate of material and wages costs may serve, but it is dangerous practice to follow a trade lead blindly, because the apparent margin indicated by a rough estimate may prove to be quite illusory.

Apart from the main factors of prime cost, wages and material and production oncosts, each estimate should provide for contingencies such as errors and defects incidental to manufacture, overtime working, inspection and trials, guarantee liabilities and any other trading condition.

Guarantee conditions necessarily vary, but a typical undertaking may be cited:

GUARANTEE.

All Products are accepted by the Purchaser subject only to the following express warranty, which excludes all warranties, conditions, and liabilities whatsoever which might exist but for this provision.

In the event of any defect being disclosed in any part of a Product (except specialities of other firms, for which we shall not be responsible) we undertake, on return of the defective part to our Works, carriage paid, within twelve calendar months after the delivery of the product, to examine it, and should any fault be found, on such examination by us, to be due to defective material or workmanship, we will repair the defective part or supply a new one in place thereof, free of charge.

Selling Prices.

p. 71.
p. 562.

Besides the contingency provision, consideration must be given F 138. to preparatory expenditure, such as drawings, patterns, jigs and special tools, so as to recover these costs in due time.

In the case of contracts, there are likely to be conditions attached carrying considerable responsibility, and these must be carefully scrutinised accordingly before any tender is submitted.

In the treatment of cost accounts in Section VI., recommendation is made as to identifying all production preparation costs, with the order on which they are first incurred. This course does not imply that the selling price of the first order should be expected to recover the whole of these costs, in all cases, while in standardised production they would constitute a general charge.

p. 467.

In the matter of production oncosts the issues involved are discussed at some length in Section VI F. It is very necessary that the estimator should appreciate the true incidence of production oncosts, and prepare his estimates in such detail that oncosts may be applied on a correct basis.

p. 428.

It is recommended that production oncosts be applied on the basis of time worked rather than of wages paid, and for estimating purposes substantially the same result may be obtained by expressing the production oncosts per hour in terms of a percentage on the average wages per hour.

Very frequently, perhaps more frequently than not, the application of production oncosts is carried out in a very arbitrary fashion. A flat percentage is, under such conditions, usually applied to the total wages, no discrimination even being made between machine and hand wages. Sometimes a percentage is added to the estimated material, and so far as this is a contingency allowance the practice has justification, but as an allocation of production oncosts to materials, such a practice can be illogical if applied indiscriminately. In the case of heavy bulky material some recognition of handling expenses may be desirable, and this is done in the printing trades.

p. 552.

It will, in some trades, be found a useful practice from the point of view of fixing selling prices, to prepare the estimate totals on the lines of conventional oncost percentages adopted in the trade, as well as on the same lines as the actual cost accounts are prepared.

Selling Prices. These alternative methods will involve very little extra trouble, as the estimate detail necessary for following a proper system of applying oncosts will more than provide all that is necessary for applying arbitrary percentages. Comparison on these lines may enable a shrewder judgment to be exercised as to probable competitive prices.

p. 530.

So far as commercial oncosts are concerned, these are best provided for as a percentage addition to the production costs, but an analysis of actual selling expenses is recommended before accepting an average percentage as sufficiently correct. Commercial oncosts are to be understood as including all expenses not directly pertaining to production. All other costs should be included in the estimated production cost, even where, as in regard to the contingency allowance, there may be no exact parallel in the cost accounts, and where, as in the case of preparatory expenditure, the estimate may only cover a portion of the prospective costs.

The commercial oncosts percentage should be applied on the total production costs. Profit should be added to the inclusive cost thus reached. It is an old established practice, however, in the absence of any analytical method of building up selling prices, for the oncosts, both production and commercial, but particularly the latter, to be derived from the financial accounts and considered as a percentage of the turnover.

If these oncosts are to be applied on the basis of production cost, the percentage will be proportionately higher than when the percentage is taken on turnover.

If, for instance, in any period it is found that the above mentioned commercial oncosts are $12\frac{1}{2}$ per cent. of the turnover, and if the net profit represents another 10 per cent. of the turnover, then the balance is the production cost and is $77\frac{1}{2}$ per cent. of the turnover, that is £77 10s. out of every £100 of sales. In applying these average results to the building up of new selling prices, the problem will arise as to the percentage to be added to the estimated or actual production cost to cover the average commercial oncost factor and give the desired rate of profit. To apply the above illustration, what percentage added to £77 10s. will give the same amount as $22\frac{1}{2}$ per cent. on £100? The answer is 29 per cent. The calculation required is quite simple. The first step is to compute the ratio of the commercial oncost plus profit factors to the production cost factor. The next step is to express this as a percentage by multiplying by 100 :

$$\text{Thus } \frac{22\frac{1}{2}}{77\frac{1}{2}} \times 100 = 29 \text{ or } 29 \text{ per cent.}$$

The "commercial oncost" and net profit percentages on turn-over referred to above are quite commonly spoken of as the gross profit percentage, but the wording is loose, because oncosts, whether production or commercial, can by no stretch of imagination be considered as an appropriation of profit; they are as fundamental a part of inclusive costs as are the prime costs. The difficulty of determining their true incidence does not make them, in consequence, an optional item in arriving at proper selling prices, and it is detrimental to clear appreciation of manufacturing and commercial conditions to talk of gross profit at all. A better term would be that of the *trading margin*.

Commercial oncosts should be expressed as a percentage to total production cost, thus arriving at the inclusive cost, and then the provision for profit applied as a percentage on the inclusive cost, for, subject to discrimination as to the commercial oncost percentages that apply to different classes of product, there is hardly an alternative way. It may be thought that this is merely doing in two stages what can be done in one by using an equivalent "trading margin" percentage. There is, however, this important advantage, that in the two stage method advocated an inclusive cost is first established and the actual margin of profit to be sought for on any particular tender can be considered on its own merits, and, if need be, the normal margin intelligently cut down or increased to suit the business under consideration.

In settling list selling prices of standardised product the question of a third percentage may arise to cover agent's commissions or trade discounts. This is best done by an appropriate percentage addition to the net selling price previously reached.

These various considerations will make the following table of equivalent percentages of wide application.

Percentage (a) on gross amount	Equivalent percentage on basis amount, i.e. gross amount less a %.	Percentage (a) on gross amount.	Equivalent percentage on basis amount, i.e. gross amount less a %.
5	5.27	30	42.86
7½	8.11	32½	48.15
10	11.11	33½	50.00
12½	14.29	35	53.85
15	17.65	37½	60.00
17½	21.21	40	66.66
20	25.00	42½	73.92
22½	29.03	45	81.81
25	33.33	47½	90.48
27½	37.93	50	100.00

Selling Prices. In using odd percentages in this connection and many others the ordinary ready reckoners are of little or no service. There is however a most valuable and monumental book which meets these requirements and should be better known, viz., *Colsworth's Direct Calculator*.

Construction of Estimates. It is recommended that the cost data which can be so important for commercial estimating, shall be ordinarily kept for each order under the following heads :

Net Production Costs
Production Preparation Costs,
Errors and Defects
Final Inspection, Packing and Despatch.

p. 465. Under net production costs there should appear, as regards wages, separate totals for direct machine wages, direct hand wages, secondary wages and overtime charges. Secondary labour is the labour specifically expended on a production order without directly affecting the condition of the work itself, thus supervision or examination might be dealt with in this way, equally with attending on customers' inspectors and carrying out customers' tests.

p. 250. As to overtime expenses, these are the extra allowances that are paid to workmen when working beyond the normal day. Thus an hour and quarter's wages may be paid for an hour's work, and it is this extra quarter of an hour that is in question as an overtime expense. Questions might arise of other overtime charges, such as power, incidental to a particular order.

So far as estimating is concerned, only the direct machine and direct hand labour can be detailed out. Secondary labour must be allowed for by a percentage addition to the direct wages. Overtime will be allowed for by means of the contingency allowance, conveniently applied as a percentage addition to the estimated production cost according to the character of the product and trade circumstances.

There is no question that the proper method of working out the detail of the estimated direct labour is in terms of hours under the various processes involved, such as turning, milling, fitting, etc., and then applying to the total hours under each heading an average wages rate and an average production oncost rate.

The advantage of this method lies in furnishing a most valuable guide to the probabilities of delivery, having regard to the shop capacities of the respective kinds.

The difficulties of applying this method will be in the tendency of commercial estimators to estimate the labour as a lump sum for

all processes on each component. To dissect the labour under the various processes, whether in terms of time or money, must take a great deal longer, in comparison with the lump sum method; but, on the other hand, the result will certainly be more accurate and more useful.

Where the estimate has reference to a line of standard product that will be manufactured in quantities, extra work in preparing the estimate will be well repaid. It is very important that the managing director shall not permit any standard product to be manufactured until an estimate prepared on these fuller lines has been made up and submitted to him.

Where the estimator cannot go the length of dissecting the estimated wages under specific classes of labour, he should at least F 9. separate machine labour from hand labour.

The preparation of detailed labour estimates in terms of time and by processes is likely to be beyond the capacity of a commercial estimating department, and this phase of estimating therefore requires to be handled by a production estimating department if it is to be properly done. Such a department may resolve itself into one or more production estimators acting as rate-fixers—men qualified to analyse the manufacture of each item of product into its elements and so compute with accuracy the time necessary for each operation. These estimates may be applied to commercial purposes equally with production purposes for individual systems of payment by F 60. results, e.g. piecework and premium system.

The skill and experience necessary to this work will include ability to assist in many related matters, amongst them being

- (1) investigation of the suitability of any manufacturing proposition and similarly of any proposed contract for the particular works concerned. p. 10.
- (2) provision of preparatory equipment, such as jigs, fixings, special tools and gauges. F 58. p. 139.
- (3) intelligent forecasting of the time required for delivery, taking into full account shop capacities. F 52. p. 9.
- (4) investigation of the cost of errors and defects arising during the course of manufacture. F 98. p. 167.

Turning to materials, as ordinarily understood, it is advocated that the cost accounting system, and therefore estimates, shall discriminate firstly as between materials proper and disbursements. p. 453.
p. 458.

Disbursements may advisedly comprise staff charges (as, for example, drawing office time) and despatch charges (freight, insurance, etc.). The wages and expenses of men working away can F 120.
F 121.

**Construction
of Estimates.**

conveniently be dealt with as disbursements, and so avoid confusion with works wages. This separation also enables more discrimination to be exercised in the application of production oncosts.

As regards materials proper, these may be advantageously dealt with under four main headings :

Special Purchases.
Process Products.
General Stock.
Component Stock.

p. 449. The headings are almost self-explanatory, but are necessarily dealt with at some length in connection with cost accounts.

No definition seems necessary of special purchases as these will be understood to refer to purchases of material not ordinarily kept in stock.

p. 450. The term "process product" is not a usual one, and is arbitrary enough to require explanation. A process product is considered in this book to be the product of a departmental or intermediate process, of such a nature that it is convenient to treat such product as the "material" of a further stage or it may be as a by-product to be sold. The most typical cases are the products of the foundry and smithy, viz. castings, forgings and stampings. Galvanising and plating are other instances of processes requiring a similar accounting treatment, though not otherwise on all fours with foundry and smithy processes.

It is recommended that the heading of "process products" should include purchases of the prescribed character as well as works products. This consistency will add to the value of cost data for reference purposes, and possibly influence the make up of the contingency allowance included in the estimate.

It is a matter of importance that process products shall be
F 127. rated accurately, and this can hardly be achieved by taking the average cost per unit of weight for the whole of the products of a given period, although such a practice is quite common.

p. 512. For instance, in most brass foundries, the nature of the work makes it difficult to get individual costs, and average rates per pound are almost unavoidable. However, by grading the average rates up and down, to suit the various classes of castings made, a very close approximation to the real individual costs may be reached.

With iron castings, forgings and stampings, individual costs as to the principal operations can be obtained, and on this basis individual rates per hundredweight can be calculated.

For estimating purposes typical rates, appropriate to the class of work under consideration, can be obtained from the cost records

and applied on the basis of the estimated weights of the respective castings and forgings. Construction
of Estimates.

A representative list of typical items of general stock is given on page 290.

It is recommended in the same section that component stock should comprise standard fittings. The rates used for estimating purposes should be the total production cost, each rate including its own provision for contingencies of manufacture. F 128.

In the building up of an estimate, there is no appreciable trouble involved in dissecting the material under the headings previously mentioned, and considerable help is afforded in the comparison, later, of the estimated cost and actual cost. F 9.

In the engineering trades, material estimates can usually be conveniently made in the drawing office in collaboration with the buyer. If there is a production estimating department who can provide the wages estimate and delivery date, then the functions of a commercial estimating department become absorbed in that of sales management, whether conducted by a sales manager as such or performed by the managing director. Whatever the procedure or staff used for preparing estimates it is certain that actual cost should be, in due course, set out under the various heads alongside the estimate and placed before the managing director for each and every contract. Somewhat similar comparison should be made in the case of standardised production by batches or by periods of manufacture. F 10.
F 63.

I D

CORRESPONDENCE

**General
Responsi-
bility.**
p. 16.

THE proper routine for correspondence hinges on the apportionment of responsibility.

If there is a fully constituted correspondence office, then the clerk in charge may take a large measure of responsibility as to the handling of correspondence, but his or her functions must always include the filing and mailing of correspondence.

Whether a correspondence office exists or not, the essential responsibility for the subject matter of the replies must rest on the departmental heads concerned, and for this reason each head may possibly sign all the letters for which he is responsible. The better practice, however, is for him to initial each letter and, subject to the size of the firm, for the managing director to actually sign all letters, if the latter is to exercise an adequate control of the departmental dealings with the outside world.

It may be taken as sound practice to restrict the signing of letters to as few officers as possible, and to have a strict ruling on this matter. The advisability of this course is obvious, as letters are frequently of considerable importance as to wording, both from the legal and diplomatic standpoint. Another point to be made in passing is never to allow a letter to be sent out that is not strictly courteous, however firmly worded. The temptation to write stinging replies should be resisted, as not likely to serve the best interests of the firm.

The art of writing concise, lucid letters requires cultivating, and the judgment of the managing director as to the impression they will give to the recipients, is likely to be much more reliable than that of the party who has dictated the letter.

The responsibility for the safe disposal of remittances received by post is best met by the use of a cash inwards book, in which entries are made during the process of dealing with the mail and before the letters are issued from the board room, or wherever the morning's mail is dealt with. The entries should be checked at

the time, and this will be arranged by the officials who deal with the letters in the first instance, probably the secretary and correspondence clerk. General Responsibility.

The responsibility for despatching correspondence must not be overlooked and where there is a correspondence office the duty clearly lies with that department, but failing such a department, the matter requires looking after by an adult member of the commercial staff assisted by the necessary juniors. If need be, the duty may be taken in turn round the office, as a certain delay in getting away at night is likely to be entailed. The question of enclosures is quite an important feature of mailing that requires watching, and senior help is advisable in connection with checking enclosures, stamping and the catching of mails. The mailing in one envelope of all communications to any one firm requires some little organisation, and may not always show enough economy to be worth while. Window envelopes greatly facilitate mailing.

Strictly speaking, every letter received should be answered the same day as received, or, failing a reply, a formal acknowledgment should be sent intimating that the letter is having attention. General Routine.

The correspondence clerk can, with advantage, watch that replies are not held up, though a good deal of routine work is involved if this is to be done, as compared with just issuing the letters as received to the departmental heads concerned, and leaving them to deal with the replies.

It is always important to endorse the date received on every inward letter or other document. A numbering stamp can be incorporated with the dating stamp, so that no extra operation is necessarily required if letters are numbered. Numbering is an essential preliminary to registering.

The necessity for registering inwards correspondence and marking off the replies depends on local circumstances. If these arrangements are entirely favourable, the risk may perhaps be taken of letters not getting attention for want of registration. Generally speaking, however, some sort of register is necessary, if only of a very simple character.

One such simple method is to list the letters received each post, stating very briefly the contents and giving registration no. made up of a number for the day and a serial no. *e.g.* 231/7. All letters received that day would bear 231, and the secondary numbers run from 1 upwards each day. The next working day's number would be 232. A note is made when the letter is sent out of the correspondence office. The register is marked off by a cancelling vertical stroke as the letters come back for filing after being dealt with. A diagonal

**General
Routine.**

stroke by pen or pencil across the right hand top corner of a letter is a very simple way of indicating that it is to be filed.

Where there is a correspondence office for the filing of all correspondence and for writing letters to departmental dictation, it may prove a serviceable compromise if the correspondence register is only entered up as regards the name of the sender, the numbers being already printed in. Such original letters which are passed out of the hands of the correspondence office, should first have their contents briefly entered in the register, and the disposal of the letter indicated. An alternative method, and one rather to be preferred, is to retain the original letter in the correspondence office and type a copy for issue to a department. This practice allows for extra carbon copies to be sent to other interested parties for the one typing.

Under the latter arrangements the correspondence clerk can hold the originals in a sorting service, under departmental names, pending the receipt of the reply, and can readily watch that replies are not unduly delayed.

If the departments are furnished with copies of inward letters instead of originals they can retain these copies, and to same can be attached an extra carbon copy of the replies- the official copy of each reply being filed in the correspondence office with the original letter. This gives each departmental head a file of his own correspondence without reference to the correspondence office. The official copy should be on distinctive colour paper from that of the departmental copy, and plainly printed "Official Copy. Not to be taken away."

p. 46.

The practice of press copies being taken of outward letters showing the signatures is more a matter of theoretical safeguard than practical necessity, and under the majority of commercial conditions can be safely abandoned in favour of entire reliance on the loose carbon copy.

There are modern copying machines which allow for loose sheet copies to be made very rapidly, it might be said automatically. Comparison with the old method of using copying presses and bound letter books is entirely in favour of the modern methods, so long as there is the proper organisation for controlling the filing of correspondence. The institution of adequate control of filing must precede the adoption of loose sheet methods.

The objection to retaining the letter book is the serious delay in getting out any range of correspondence, and sometimes the uncertainty of obtaining serviceable press copies.

Not infrequently the letter book system is retained in conjunction with the filing of carbon copies of the replies with the original letters. This allows for the adoption of a modern system of filing.

Special attention is necessary to ensure that telegrams are dealt with promptly and confirmed. A good practice is immediately on receipt to type a telegram confirmation form with extra carbon copies on coloured sheets, one of which should go to the managing director and another to the department who have to reply or who are interested. The top copy will go to the sender. A further copy can be used to build up a telegram register, while another copy is filed with the correspondence. Similarly with telegrams outward these should be confirmed and a carbon copy of the confirmation filed in the telegram register. Consecutive numbers are given to the copies in the register and this reference number is typed on the confirmation form.

General
Routine.

A telegram register of this character provides a ready means for checking the post office account for telegrams sent by telephone—the usual business method.

In certain circumstances the use of dictating machines enlarges the function of a correspondence office by obviating the necessity for departmental stenographers, or for attendance of stenographers from the correspondence office.

Dealing with callers and telephone messages comes advantageously within the scope of the correspondence office, and the control of the door attendant may also be given over to the correspondence clerk. The use of callers' slips is not usually any improvement on requiring their cards, and does not particularly help matters.

The correspondence clerk should be so fully cognisant of the arrangement of responsibilities amongst the higher officials as to be able to intelligently instruct the door attendant when the latter is in any doubt as to whom to refer a caller.

A good arrangement is the provision of a telephone in the waiting room, so that callers may be spoken to, if necessary, by the departmental heads they are desirous of seeing, thus saving much time to both parties.

It is a very common and very helpful practice for a private telephone switchboard or exchange to be installed in connection with the national telephone service and also for an independent internal telephone system for intercommunication between departments. The control and operation of such exchanges come conveniently under the correspondence office.

The internal automatic system however obviates the need of an exchange operator for departmental intercommunication and is designed to give much greater efficiency by eliminating the human operator.

**Filing
Systems.**

p. 44.

The relative advantages of the various systems of filing now available are sufficiently advertised by the makers of the various appliances and accessories as to need no mention here.

The essential principle of any satisfactory system is that each letter and its reply will be filed together, and that all correspondence with any one correspondent or on any one subject will also be filed together and, preferably, be contained in a folder independently of other correspondence.

The question of filing under subject references is fraught with difficulties, except it be carried out on broad lines that are the natural outcome of the particular business under consideration.

Correspondence with agents, for instance, will be likely to necessitate sub-classification under subjects of which the following are typical: Appointment as agent, Financial, Miscellaneous, Quotations. Quotations may again have to be subdivided under the headings of different lines of products.

The adoption of number symbols in lieu of alphabetical sequence of names undoubtedly facilitates filing when the number is remembered, as easily results, and tends to ensure that old records, which have been transferred from the current filing cabinets, will be found nearly as quickly as current records.

- F 6. An alphabetical card index will be necessary to give the requisite cross reference to the number symbols. On the same index card can be recorded, if thought necessary, a summary in brief of correspondence with each correspondent. This will facilitate reference to particular subjects, and its adoption must depend on the frequency of each class of reference. Current reference will hardly require the aid of a written index, except, maybe, in the special cases of agents and other instances of voluminous correspondence from any one party. The same alphabetical card index will furnish a record of addresses.

In the matter of correspondence *re* purchases, the classifications under subject matter is likely to be more permanently useful, where any considerable range of purchasing is involved, than the name of the suppliers, and the general classification suggested, in connection with stock accounts, will be found helpful in formulating a scheme of subject number symbols. There may be under each heading, subdivisions dealing with, say, enquiries and quotations, deliveries, and accounting matters in alphabetical sequence of suppliers' names.

- F 8 In certain directions, such as the collection of accounts and following up enquiries, the filing of the correspondence is really only subsidiary to the record in the card index. Separate card

indexes are essential in such cases, and will be best kept up in the **Filing Systems.** financial and sales departments respectively.

In adopting any method of indexing, whether numerical or alphabetical, or a combination of both, regard must be paid in the first instance to the conveniences of locating correspondence that has been transferred from the current files.

A numerical system is apt to be rather cumbersome for occasional correspondents, and yet the correspondence in individual cases may easily rise beyond the point of convenient finding under alphabetical references, unless the subdivision under each alphabet letter is carried to a fine point. If a finely subdivided alphabetical scheme is necessary or simpler for the rarer correspondents, it becomes a question if that scheme should not cover the most frequent correspondents as well. One notable system of this class on the market is developed to the extent of there being 240 subdivisions of the alphabet. Investigations by the suppliers in question show that the proportions of English names under the respective initial letters of the alphabet average out as follows per 1000 names :

A	B	C	D	E	F	G	H	I	J	K	L	M
34	105	82	44	24	36	50	83	7	25	21	50	74
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
21	10	55	1	48	96	40	3	8	78	—	4	1

It will be obvious that subdivision under the different letters will, in turn, require to be averaged out if each subdivision is to have anything like an equal amount of correspondence to hold. The best of schemes will be upset if special files are not set aside for voluminous correspondents, and an auxiliary numerical scheme for such will prove entirely advantageous.

Correspondence within the works should be for the most part **Internal Correspondence.** carried out by specified forms appropriate to each routine. A certain amount of memorandum work will arise, and a suitably printed form regularises it without entailing appreciable expense. F 106.

Under some conditions it may be necessary for the recipient of a memorandum to initial for it on the fast copy in the memorandum book, brought by the messenger, though this savours of legal process and lack of mutual trust.

The transit of routine forms and memorandums between departments, whether shop or office departments, should be dealt with by an internal or works post operating from a suitable centre. This centre would normally be the correspondence office.

The service should be carried out by having messengers make regular journeys round the departments, leaving one post envelope

**Internal
Correspon-
dence.**

and collecting the waiting one. The sorting of the papers thus collected will require close knowledge of the works and office routine and should be carried out accordingly by the clerk who supervises the messenger or messengers.

p. 62.
p. 366.

The institution of an internal postal service should precede any development of modern routine systems involving the regular transit of forms between departments. This regular service will obviate papers going astray, it will give a prompter service on the average than special messengers who have to be taken off their ordinary work, and will achieve far more economy than the service need cost to run. The pneumatic tube service, such as is used in post-offices, although expensive to instal, may be justified under some circumstances where time saving is of pressing importance and the traffic in papers is more or less continuous.

I E

INSURANCE

ALL sorts of persons can and do act as insurance agents, but only a small minority have a real knowledge of the subject. The consequence is that insurers do not get that advice and help that they should and, moreover, the amateur agent is so ubiquitous that the possibility of an alternative better and financially sounder service through skilled channels is very generally overlooked.

General
Considerations.

There are however insurance brokers, that is professional insurance agents, who can be consulted with advantage, as insurance advisers, and it is desirable that such assistance should always be obtained. It is not a question of fees because whoever acts as agent gets a commission from the insurance office, with whom the business is placed. The point is that the insurance broker has or should have the wide knowledge necessary and, for the sake of his reputation, places that knowledge honestly at the service of his client, much as a stockbroker is expected to act.

One of the first steps such an adviser should take is to consolidate each class of insurance and arrange for them to all become renewable on the same quarter day.

The arrangement of insurance is a function of financial management and usually therefore falls to the secretary. He should have schedules of all current policies of each class prepared and kept available for handy reference.

p. 16.

The practice of partial insurance is uneconomical because the saving, as compared with full insurance, is never sufficiently great to compensate for the consequent insecurity as to liability.

Fire risks should be always considered when the plans for a factory or its extension are being settled, as, frequently, by very minor alterations involving small cost the fire insurance premium rates can be considerably reduced. The point of moment is that

Fire
Insurance.

Fire Insurance.

the reduced premium indicates, in the experience of fire offices, a lessened risk, so that the actual cost of alterations is not to be criticised merely in the light of the reduction possible in premium rates but also as a positive precaution against fire.

The services of a fire insurance surveyor to discuss existing or proposed risks are likely to be most valuable and these are readily arranged for through the firm's insurance adviser.

The following schedule (1913 Scale) gives the rebates allowed in respect to fire precautions.

SCALE OF ALLOWANCES

For appliances for the extinction of fire kept or situate on the Premises insured.

	Percentage of Premium.
1. BRIGADE PORTABLE STEAM FIRE ENGINE, OR FLOATING STEAM FIRE ENGINE and a trained Fire Brigade to work the same	10
2. MANUAL FIRE ENGINE of modern construction, not less than 12 manual power, and a trained Fire Brigade to work the same	5
3. BOILER PUMPING ENGINE, OR STATIONARY FIRE ENGINE of efficient power, with Hydrants attached or in yard, and at least one Hydrant connected therewith on each landing of the staircase or on each floor, the Engine to be worked by power always available	10
4. BOILER PUMPING ENGINE, OR STATIONARY FIRE ENGINE, as in No. 3, but without a Hydrant on each landing or each floor	7½
N.B. 1.—Allowances under Nos. 3 and 4 are not to be treated as cumulative.	
N.B. 2.—Under Items 3 and 4, petrol or motor spirit Fire Engines may only be accepted if used in conjunction with Turbine Pumps and after full particulars have first been submitted for approval on forms provided for the purpose. The special regulations respecting petrol or motor spirit Engines contained in the forms must be complied with.	
5. TWO OR MORE FIRE PLUGS OR HYDRANTS in the yard and at least one Hydrant on each landing of the staircase, or on each floor, supplied with water from public waterworks, elevated reservoirs, or other independent source, with adequate constant supply	7½
6. TWO OR MORE FIRE PLUGS OR HYDRANTS, as in No. 5, but without a Hydrant on each landing or each floor	5
N.B. 1.—In the case of Risks having no Yard in which Fire Plugs or Hydrants can be fixed, at least one Hydrant on each landing of the Staircase or on each floor, or in the case of Sheds at least two Hydrants, may be regarded as equivalent to two or more Fire Plugs or Hydrants in a Yard.	
N.B. 2.—Allowances under Nos. 5 and 6 are not to be treated as cumulative.	
In all the above cases there must be a sufficient quantity of hose and water available at such a minimum pressure as to command the premises insured, and particularly in the case where an Allowance is made for a Hydrant on each landing or floor there must be an adequate supply of hose kept thereon.	
In the case of Appliances fitted up after the 29th June, 1893, there must be in the mains and hose a clear water-way of at least two inches in diameter.	
7. PORTABLE CHEMICAL EXTINGUISHER OR EXTINGUISHERS having an aggregate water capacity of two Imperial gallons for each 250 superficial yards or part thereof, but not less than four Imperial gallons on each floor, the water capacity of an Extinguishteur to be not less than one Imperial gallon or more than three Imperial gallons	5
8. BUCKETS OR CANS of not less than two Imperial gallons capacity each, always filled with water, having three Buckets or Cans to each 250 superficial yards or part thereof, but not less than six on each floor	5
N.B.—In Dynamo Houses and rooms in which spirit * is stored or used in any manufacturing process the buckets or cans may, if desired, be filled with dry sand instead of water, or two approved dry-powder extinguishers, of not less than 100 cubic inches capacity each, may be allowed as equivalent to one bucket or can of water.	
* By the term "Spirit" in this N.B. is meant any liquid product giving off an inflammable vapour under 73° Fahr.	
9. EFFICIENT PORTABLE FIRE PUMPS, having not less than one to each 500 superficial yards and not less than one to each floor, with adequate water supply	5
N.B.—In order to qualify for the Allowance under Items 7, 8 and 9 and the N.B. 1 to item 6, it is not necessary that each floor of a building should be equipped with the same description of appliance, that is to say, the requirements	

under those items may be regarded as alternative in respect of the various floors, provided, however, that in order to qualify for 10 per cent., there must be at least two distinct classes of appliance to scale on each floor.

Fire
Insurance.

Memo. No greater Discount or Allowance than 15 per cent. will be made for any combination of the above Appliances, nor more than 10 per cent. for any combination of the Appliances set forth in Items 7, 8 and 9, and the N.B. 1 to Item 6.

The revised requirements as to the capacity of Extincteurs, Buckets or Cans referred to in Items 7 and 8 need only be applied to such Extincteurs, Buckets or Cans as are provided after the 18th April, 1913. Extincteurs, Buckets or Cans provided prior to that date, need only comply with the requirements then in force.

The discount for automatic sprinkler installations varies, the stock and plant in some industries being more susceptible to water damage than in others.

The discounts also depend upon the standard of the installation, but in the case of single water supplies the allowances run from 7½ per cent. to 20 per cent., and, for installations having not less than two water supplies, the allowances range from 25 per cent. to 60 per cent., these being in addition to the allowances under the scale for ordinary appliances.

Rules for the organisation of a works fire brigade are given on page 264 and regulations as to fire precautions on page 257.

The vital question in fire insurance is not, of course, the rate of premium, although economy there is unqualified gain in dealing with strong companies, but the amount of cover provided. It must be borne in mind that the cover to be aimed at is replacement value and therefore if the sum insured does not represent the replacement value, then the insurer has to bear that proportion of the loss which his cover falls short of the total risk. With book values of property at pre-war figures, the penalty of covering book values instead of replacement values is likely to be ruinous. In a recent case the insurer, through neglecting to adjust his cover, had to bear three-quarters of the loss—in that instance as the fire resulted in total loss, he received the full sum for which he was insured but that sum only went one-fourth of the way towards the cost necessary to replace the goods in question. The difference was not entirely due to increase in costs but none the less the whole penalty arose through inadequate cover.

In a works with its various departments there is always a great chance of fire cover proving inadequate without being observed unless steps are taken to prevent this possibility.

In this connection the services of the insurance adviser can be valuable in criticising the schedule of cover to be provided. Such a schedule will require to give the values pertaining to each department, dissected under various heads of buildings, plant and stock.

Another heading to be provided for is for contingencies, notably either loss of rent or payment of rent during rebuilding, according to whether buildings are owned or leased, and architects' fees for

Fire Insurance.

rebuilding. These items are usually included in the fire schedule, of which the following is an outline example.

Plan Ref.	Risk	Building.	Plant.	Stock.	Contingencies	Total.
		£	£	£	£	£
1	General Offices -	2,000	500	—	—	2,500
2	Stores - - -	1,000	500	10,000	—	11,500
3	Warehouse -	1,000	500	10,000	—	11,500
4	Machine Shop -	5,000	10,000	5,000	—	20,000
	Stock in Yard, etc.	—	—	2,000	—	2,000
	Architects' Fees -	—	—	—	1,000	1,000
	Rent - - -	—	—	—	1,500	1,500
		9,000	11,500	27,000	2,500	50,000

If such a schedule is kept in a condensed form constantly before the secretary of the company, who usually will have the arrangement of insurance, there should be no likelihood of neglect in adjusting the cover under the respective heads as additions or reductions are made in respect to the respective values. The cost department can usually be made responsible for reporting these alterations in values monthly. Adjustment of policies should be made when the amount involved is sufficient to justify it.

It may be laid down as bad practice for fire cover to be arranged as one lump sum without being dissected as indicated for, otherwise, serious difficulty may arise in establishing a claim, short of total loss, and the need for adjustment of cover from time to time is not so readily apparent.

With large works, schedules on approved lines are printed and the total cover divided amongst different fire offices by the insurance adviser or by the fire office giving the premium quotation. The fact that the schedule is printed should not lull the insurer into procrastination as to necessary adjustments.

There is a further fire contingency to be considered, viz., *loss of profits*, owing to dislocation arising from fire. This is of so different a character from the ordinary fire cover as to be subject to a separate policy. It covers loss of profits for a period, as arranged, of 6, 9, or 12 months and the rate is approximately 50 per cent. more than that for fire if a full year's cover is taken.

The claim is based on the fall in turnover as compared with the previous year, and is usually taken month by month; a specimen claim is given below, based on a trading profit of 10 per cent. on turnover. In addition the standing charges or oncosts are usually

covered, including the rent of any premises temporarily used **Fire Insurance** during re-building operations.

SPECIMEN CLAIM FOR LOSS OF PROFITS.

Turnover.	Before fire.	After fire.	Reduction.
	£	£	£
January - - -	10,000	nil.	10,000
February - - -	10,000	1,000	9,000
March - - -	10,000	2,000	8,000
April - - -	10,000	5,000	5,000
May - - -	10,000	8,000	2,000
June - - -	10,000	10,000	—
•	Total reduction in Turnover		<u>£34,000</u>
<i>Loss of trading profits</i> -£34,000 at £10 per cent			<u>£3,400</u>
	Standing Charges or Oncosts		<u>2,000</u>
	Total claim - - - -		<u>£5,400</u>

Workmen's compensation insurance should always be placed **Workmen's Compensation Insurance** with an office with a very strong standing, owing to the fact that in case of permanent disablement weekly compensation may become payable as long as the employee lives. If the insurance company liquidates, the liability at once falls on the employer.

Several cases have come under notice where firms, to obtain a lower rate, have insured with a weak insurance company which has been wound up and the employer saddled with the payment of compensation without any means of redress.

This class of insurance is eminently one that should be handled by an insurance adviser as very careful negotiation may be necessary to obtain the most favourable rate and difficult questions may arise at the annual renewals.

The premiums are calculated upon the amount of wages paid during the year and every worker is automatically covered immediately he or she enters the service of the firm. The initial payment is by estimate, which is adjusted at the year end. As the rate of premium per £100 of wages may range from 10/- to £5, or even more, it follows that the payment involved is an appreciable charge on the business and carefulness in arranging the insurance becomes the more necessary.

The responsibilities of employers in regard to compensation are indicated on page 199. The employer is responsible also for rendering an annual return to the Board of Trade of all accidents and compensation paid, except where he is insured with an insurance com-

**Workmen's
Compensation
Insurance.**

pany which has arranged to make this return on the employer's behalf.

It should be noted that firms are also liable for accidents to persons not in their employ but who may be injured either in their works or through the fault, negligent or accidental, of any of their employees. This cover is usually added to the Workmen's Compensation policy, and for lack of a better basis, is based on the total amount of wages paid to employees.

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p. 212.
p. 229.
p. 255.

The establishment of a works casualty station or ambulance room, particularly when under the direction of a works medical referee with trained nurses in immediate charge, can have a marked influence on the cost of workmen's compensation insurance by minimising the effect of accidents and thereby reducing the extent of the claims.

Another and still more effective help towards better results is to induce increased attention to the prevention of accidents by "safety first" propaganda, preferably through the medium of a committee of the workers. Where there is a works medical referee, he should be an *ex-officio* member of such a committee, which should comprise skilled mechanics and foremen capable of making practical suggestions to minimise the risks of accidents in the light of local experience and conditions.

**Plant
Insurance**

Plant insurance has reference to such items as boilers, lifts, engines, electrical plant, etc.

Boiler insurance is taken to cover claims arising out of injury to persons or damage to the surrounding property caused by boilers exploding. The cover includes periodical inspection and reports by qualified engineer-surveyors, in accordance with Board of Trade requirements.

The chief causes of explosion are deterioration due to corrosion, ignorance or neglect of attendants, defective design, and excessive pressure caused by choking of pipes through frost or with any foreign matter.

Circulating, heating and hot water boilers, piping and radiators have been brought within the scope of the Boiler Explosion Acts (1882 and 1890). The Board of Trade are empowered to investigate all boiler explosions and to inflict penalties on persons held to be responsible.

Lift insurance usually covers :

1. The liability to pay compensation for any accident causing the death of or injury to any person other than an employee of the insured by reason of the operation of the lift or the negligence of the attendant.

2. Cost of repairing breakdowns of the machinery and equipment **Plant Insurance.** generally, up to the amount insured. By "breakdown" is meant the actual breaking of any of the principal parts of the equipment and in the case of electric lifts, the burning out or failure of the insulation of the motor and controller equipment, causing a sudden stoppage in the working of the lift and necessitating the repair or replacement of the damaged part. But ordinary repairs or adjustments for upkeep owing to wear and tear are not included in the term "breakdown."

In addition to covering these risks, the Insurance Company undertakes to make, periodically, thorough inspection of the machinery enclosure, locks and gates of each lift. .

After each examination a report is sent to the owner together with any recommendation that is thought necessary, conducing to greater safety and economy in working, and, in the event of defects, suggesting a remedy.

Insurance companies are usually prepared, in conjunction with the insurance, to contract for the regular oiling and cleaning of the lifts. Owners, who wish the makers to maintain, are recommended to allow the Insurance Company to make the necessary contract on their behalf with the lift makers.

It is possible to insure against breakdown, as defined above, of engines and electrical plant, and the explosion of gas producing plant. The insurance provides for periodical inspection by qualified engineer surveyors.

The value and economy of this insurance is likely to be the more pronounced where the works staff would not otherwise include a sufficiently skilled engineer. Even where the works staff is competent to do all that is necessary, the standard of maintenance is likely to be kept at a higher level when the plant is subject to inspection by independent engineer surveyors.

Motor vehicle policies should cover *all* risks, Third party, Own **Motor Vehicle Insurance.** damage, Fire, Burglary, Theft, etc. All vehicles should be insured immediately they are purchased so as to cover them for transit from the manufacturers to the purchaser's works. In the event of the vehicle being sold or replaced the policy can be adjusted to cover the replacement.

Superannuation funds commonly fail to achieve their full purpose **Super-annuation Funds and Life Assurance.** as usually no provision, except a small refund of premiums paid, is made for the member's family if he dies first, whether before or after he is superannuated.

**Super-
annuation
Funds and
Life
Assurance.**

The alternative scheme is to couple superannuation with life assurance, and in many cases a percentage of the premium is paid by the firm and the balance by the individual.

In these cases, new members of the staff are insured from the time they enter the firm, the policies maturing either at the age of 60 or 65, or previous death. The premiums are deducted from the salaries paid and the insurance adviser could arrange for monthly instalments to be accepted at pro rata rates.

By this method the whole family is provided for, not only for old age but in case of the early death of insured.

Expert advice is absolutely essential in this class of business if the best results are to be obtained.

Group insurance is a somewhat new departure and is taken in lieu of a superannuation scheme. The usual custom is for the firm to assure one year's salary to each employee in case of death, thereby avoiding the pressure otherwise exercised by the widows and dependents of employees dying in their service. The premium is adjusted year by year in accordance with the ages and wages of the employees.

No medical examination would generally be required, but the staff would be inspected as a whole by a medical man appointed by the insurance company.

Policies covering the life of the business head of firms or for partnership purposes are frequently required to replace any loss that may arise through death.

The most advantageous way is to take out a cut rate non-profit policy, for a term of years, as by this means the whole of the premiums paid are returned at the end of the term, in addition to a certain amount by way of interest. In addition to this there is a rebate allowed for Income Tax on the premiums paid, provided that the premiums on any one life do not exceed one-sixth of the total income.

Policies vary very considerably in the different offices both as to premium rates and the conditions of the policies.

The following is an example of actual rates quoted by two offices for a £5,000 cover on a 20 years' policy. Age at entry 30.

Annual premium in first office was	£204 3 4.
„ second „	£239 11 8.
A difference of	£35 8 4.

The office offering the cheaper premium happened to be far and away the better office of the two, and its policy conditions much more generous. Loans would be granted by the first office after the second premium had been paid, while in the second office not

until the third had been paid. Moreover, the loan or surrender value was lower on the policy at the larger premium, and generally the policy conditions far less elastic.

**Super-
annuation
Funds and
Life
Assurance.**

This example shows the need for a wide knowledge of insurance offices before taking up a policy.

Sinking Fund policies are used chiefly in the following connections :

**Sinking Fund
policies.**

- Replacement of capital invested in leasehold property.
- Provision for dilapidations on leasehold property.
- Replacement of premiums paid for stocks and bonds redeemable at par.
- Repayment* of mortgages and debentures.
- Replacement of money sunk in decorations and repairs.
- Replacement of machinery and plant.

Annual premiums are paid for a specified term of years, at the end of which the lump sum assured becomes receivable.

Fidelity insurance is designed to safeguard the employer against any defalcation by the staff. The enquiries made by the insurance company are necessarily thorough and, at the same time, confidential to themselves, so that the employer does not lay himself open to the charge of prying into the private affairs of his staff. There is also the real risk that such information, if received by the employer, may leak out amongst the rest of the staff.

**Fidelity
Guarantee
and Theft
Insurance.**

p. 26.

If, however, the result of the insurance company's enquiries is unsatisfactory and the employer advised that the guarantee is declined, then suitable steps can be taken to learn, in strict privacy, from the staff member in question how far his private affairs make him unsuitable for responsibility regarding cash.

It is recommended that the rule as to fidelity guarantee should be applied without respect of persons to everyone handling cash, including pay clerks.

Policies are issued covering loss of cash for wages from the time that it is drawn at the Bank until they are paid away, including its deposit over night in the safe. The rate is a very low one.

Burglary insurance is a risk calling for careful consideration and a Burglary Surveyor may be able to suggest effective safeguards to reduce the risk and thus allow the lowest possible rate to be obtained.

So far as the transit of goods by rail is concerned, insurance is seldom effected except by consigning at railway company's risk instead of owner's risk.

**Goods in
Transit.**

**Goods in
Transit.**

p. 284.

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With sea borne traffic the risks of loss or damage are far greater and more numerous than with inland traffic, and as such liabilities are not accepted by the shipping companies under the bills of lading, but very carefully disclaimed, it becomes imperative to insure accordingly. This is usually effected with Lloyd's Underwriters or one of the companies specialising in marine insurance, through the shipping agent, who arranges for the ship space, bills of lading and freight, or through a marine insurance broker.

All marine losses which are not total losses are said to be "average" losses, that is, losses subject to certain average conditions. Average losses are of two kinds, viz.: General Average and Particular Average.

General Average claims are paid by the owners of the ship and cargo, in proportion to their several interests, to make good any loss or expense intentionally and necessarily incurred for the general safety of the ship and cargo, *e.g.* throwing goods overboard, port dues in case of distress, damage caused in putting out fire on board, etc.

Particular Average claims arise through accidental loss or damage which does not affect the interests of all the parties. This loss is borne by the owner of the particular goods in question, and no portion can be recovered from the owner of any other goods on board.

In putting the value on goods for insurance purposes, it is important to include freight, insurance and other charges, as well as a percentage to cover interest on outlay; otherwise, in the event of loss, the invoice value alone could be recovered from underwriters.

I F

ROUTINE ORGANISATION

By routine is here meant those duties of a regular nature that are requisite for administrative and commercial purposes. The term commercial organisation has advisedly not been used as not being sufficiently comprehensive. General
Considerations.

In organising every-day duties, the main essentials to be considered are co-ordination and economy. To an extent economy results from co-ordination, but there are many economies possible in routine matters that have little bearing on the larger questions of efficient inter-relation of routine duties.

On the other hand, proper co-ordination may mean an increase of staff and paper work, which can so easily appear, and still more easily be condemned, as extravagance or red tape; but the test of economy lies further along the line, as to whether improved administrative control is finding expression in increased efficiency either in point of quantity, quality or cost of output, or maybe in all.

The cost of collecting information may sometimes exceed the value that actually is or needs to be derived from the information gained and it may happen that production is hampered in such collection. This is a real danger that has to be guarded against continuously, for routine that serves a valuable purpose when initiated, may cease to be useful by some later change in conditions. Sometimes routines, if the word may be so used to express specific schemes of duties, are established to correct some abuse, or to meet inexperience, and with the education of the parties concerned, the value of the routine becomes too little to be worth while maintaining.

Emphasis might be laid on the necessity, in considering the routine suggestions in this book, to bear in mind that they cannot all be worth while adopting for any one set of conditions; but all the suggestions have been found most necessary and valuable under some one or other ordinary condition.

The recognition of the latent danger of duplication or overlapping, and, for that matter, as a guard also against having links missing in

**General
Considerations.**

the administrative chain, has brought into use diagrams showing the relation of the various routine steps, as represented by books and forms. It will be convenient to call such diagrams routine diagrams, and an illustration is given on page 153.

p 585.

If every routine step is crystallised, as it were, into a definite book or form, it will be quite easy to arrive at a multiplicity of forms that may prove staggering to some managers. These same astonished managers would often be well advised to investigate how many forms and books (plain and printed) are in use in their own works already. Criticism should start from the point of view as to whether the routine step or stage that a form embodies is necessary or not. If the routine step is necessary, then is the use of a particular form necessary? Is any writing saved? Is there any advantage in having all the requisite information in just the same style every time and nothing omitted?

After that comes the question of cost of printing, and because that is prohibitive when only small quantities of a given form are used, recommendation is made of the use of copying processes whereby small quantities can be taken off a gelatine or other process slabs, of which there are kinds that are not messy and can be washed after use. With a copying process and a supply of suitable paper, not too absorbent and cut to standard sizes, a manager need not hesitate to embody all the routine steps in specific forms. These home-made forms will gain in appearance if the copy is set out with the aid of a drawing-board and tee-square, and an upright engrossing style of printing adopted. Some forms of simple character can be duplicated by means of typewritten stencils.

**Reorgan-
isation
Procedure.**

In setting out to reorganise any routine, a good deal of preparation is necessary, if the changes are to take effect smoothly.

Regard must be paid not only to the actual routine changes, or changes of routine methods involved, but to the changing of personal habits and to the influence of personal prejudice.

Once new methods have become accepted as desirable, it is difficult to be patient with those whose prejudice is longer lived. It may be better policy to circumvent this prejudice than to attempt to bear it down by the exercise of authority.

If the reorganisation is in good hands preparatory moves will be made to make ready the course, and this preparation is always important, even when the prejudice to be overcome is negligible.

Anyone who has had much experience in reorganisation will realise the necessity of keeping an open mind as to the best moves to make and the best order in which to make them. Many circumstances may arise to suggest a modification of original plans, and if

some desired result can be achieved without disturbing some habits then this should be done. In any case full notes should be set down of existing methods for future reference, before altering anything. Reorgan-
isation
Procedure.

New directions and new meaning can be oftentimes given to established methods by seemingly trifling adjustment.

It is quite an important point to consult those who have to carry out the routine work, as to the actual conditions of the work. Even if the organiser feels that they cannot be expected to understand the principles of the new lines on which he is working, he will always be the stronger for demonstrating to an interested party—it may be an opposing party—the merits of his proposals. If the organiser can convince the routine worker that a modification of routine is desirable, the results of reorganisation are likely to be the greater; and, on purely selfish grounds, the organiser should aim to have the staff with him. To take the staff with him means, or may seem to mean, painfully slow progress, but once this inertia has been overcome, progress will be both rapid and irresistible. Above all, perhaps, the loyalty of the staff will have been stimulated and quite possibly much latent merit in the staff have been discovered. Particularly should the staff realise that it is their duty at this stage to raise points not seemingly provided for by the organiser.

Reorganisation that touches the habits of men should "hasten slowly." The taking on of new habits and the shedding of old habits should be made natural by stimulating the interest of those concerned, in the new methods.

Platitudes of this sort are easily expressed and as easily ignored as being a council of perfection. Anyone attempting to reorganise must largely fashion his own methods, if he is to express himself adequately in his work, but emphasis may reasonably be laid on the educational character of the work. Patience and care in this direction is quite as important to the ultimate result as executive authority to enforce the new ideas.

Managers should guard against the passing of panic legislation. Something goes wrong, and there is a great hubbub. The Manager feels called upon to make some alteration of method to prevent a repetition of the trouble. He therefore lays down certain rules which, he hopes, will stop further trouble of that particular variety, and no more than that. He would be better advised always to analyse first the conditions that allow the trouble to arise in any acute form.

Not uncommonly systems, or what pass as systems, are built up in this piecemeal and impetuous way. Swift decisions may seem the only proper expression of strong management, but they can easily be wrong in regard to organisation, and should be

**Reorgan-
isation
Procedure.**

avoided on principle. On the other hand, vacillation is fatal to efficiency, and it may be better to stick to a wrong decision than go back on earlier instructions without very good cause.

No organisation is established until each routine duty is a habit, and this consideration should stay the hand of a manager in making alterations in routine.

In reorganising on modern lines, which means using modern methods, it is an important preliminary to arrange for stationery to be looked after properly. The adoption of form cards and sheets and the like, calls for more than usual attention in keeping the stock of stationery.

p. 314.

Having formulated the main lines on which to work, the running out of stock of old stationery will afford the best opportunity of introducing new forms. Controlling the stationery stock means early knowledge of these opportunities.

Colour schemes may be made a valuable factor in facilitating the smooth running of the various routines. Some care is necessary in adopting colours. It may be necessary sometimes to adopt different coloured inks where different coloured papers or cards might be confusing. Where carbon duplicates are made, the carbon copies should be distinguished from each other and the original, or top copy, by distinctive colours of paper or inks. Colour schemes may obviate having a different printing on each of the several copies, and this will be an economy. The difficulties of a colour scheme are somewhat reduced and ready distinction made between executive and memorandum copies, if the executive (preferably the top) copy is always on white paper. By executive copy is meant the copy that is the actual order or request to some department to do certain things. The carbon copies are of a memorandum character.

Standardisation of form sizes is very important particularly for the ultimate filing of the cards or sheets. This standardisation of sizes is one of those preliminary steps referred to above, that will help to clear the way for developments.

p. 47.

Provision for filing of papers is another preparatory step, as also is the organisation of a works post for the transit of forms between departments.

It is desirable to have the designing of all routine forms pass through one channel. This will facilitate standardisation and give a certain regularity to the forms. Uniformity of style and size tends to confusion between one form and another, but this objection is overcome by giving a plain reference no. and title to each form in the top left-hand corner, in addition to the distinctions possible with colours.

By using reference numbers the clearness of routine instructions

is greatly helped, and by affixing letters after the number to represent successive editions (if amended) of any form, both instructions as to their use and stock-keeping is facilitated. Reorgan-
isation
Procedure.

There is no doubt of the necessity for registering the routine pertaining to each form, and these instructions should be issued to all concerned for insertion in a suitable file or looseleaf binder. The guard book should be handed in on resignation or change of duties.

Whenever possible, the routine instructions should be supplemented by a routine diagram, showing the path of the different forms as to the executive copy and any memorandum copies, or duplicates.

Emphasis generally should be laid on the importance of each person, handling any form, being responsible for its completeness as it comes to him. A parallel may be found where a workman is responsible for the completeness and apparent good order of work as he receives it. While in production this check may be insufficient, in routine matters such a check ought to be sufficient.

A point that may be made is that newly appointed managers should look very carefully into the system of administrative records, on which the cost accounts are built, before disturbing any of the existing conditions in offices or works.

p. 333.

It will generally be desirable, though not always practicable, to reform the system of accounting, if reform be needed, before reforming the organisation, so as to get the accounts in their new form to reflect the old conditions. If this can be done, a fair comparison may be made with new conditions when these have been established, but, otherwise, the new manager may find himself unable to demonstrate economy from the very fact that methods of allocation and treatment of expenditure have been simultaneously altered.

The nature, policy and condition of each business and the type of management, all have their influence on the form in which statistics relative to the works can be extracted best. Admini-
strative
Statistics.

The principles on which a works accounting system is constructed should be such as to provide with the minimum of analysis or reconstruction, the essential statistics necessary for exercising continuous efficient control. These principles are considered in detail in Section V. Administrative Records and Section VI. Cost Accounts.

p. 15.

The initiation of statistical abstracts relative to the works may emanate from the managing director, but it will be well for the works manager to arrange with the works accountant for abstracts to be prepared for his own guidance as will be suitable, if need be,

for the managing director's use, rather than have overlapping abstracts, with the consequent extra trouble. The works manager should apply his practical experience of the conditions of the works so as to ensure that the statistics reflect the real facts of the case.

The proper use of statistics demands an intimate knowledge of how the figures are arrived at, and the works manager should be responsible for the system by which the works data is collected.

The managing director may be expected to exercise a judicious restraint as regards the variety of statistics required by himself or the board of directors, lest statistics be taken out with monotonous regularity without being used, probably for want of time, and possibly for want of inclination. It is an unwise discipline that insists on statistical abstracts and reports as a matter of form, and merely as a visual demonstration of authority. On the other hand, a proper works accounting system is largely abortive, if detail figures are entirely ignored, for in this direction lies the means of recovering many times over the expense of keeping proper works accounts by increased works efficiency and economy.

It is really the works manager for whom the works accounts should realise their greatest possibilities, both in the first stage of administrative records and the final stage of cost accounts, and he is robbed of his full opportunities if he is not allowed to take an adequate interest in them.

The works accountant can do a very great deal to help the works manager to get the benefit of the data that is collected, but that presupposes that the cost accounts are not held to be a private preserve of the financial side of the business.

It is generally recognised that the value of statistics lies in their availability for comparison, and that averaging is necessary to get their true import.

From this follows two main requirements in statistics, firstly, that the scope of the figures to be compared shall be identical, and secondly, that the basis upon which averages are calculated shall be such as will not misrepresent the facts underlying the original figures.

p. 548.

A typical example of how average statistics can be misused is often found in connection with works expenses. Works expenses are very commonly averaged as a flat percentage on the direct wages. This is so temptingly easy to do that few can resist doing it. The harm is not in trying out the figures in this way, but in accepting these average ratios as incontestable evidence of the efficiency or otherwise of the works management.

A very brief consideration will show the inherent fault in such a method. Firstly, if machine work is substituted for hand work, the direct wages total will fall appreciably, and the expense total may rise a little, while the ratio of expenses to direct wages will increase to a marked degree—withal the total production costs per article will almost certainly have been appreciably reduced.

Similarly, if the quality and interchangeability of machine work is so improved that fitting work is largely eliminated, the expense ratio to direct wages will rise. Again, if automatic machines are substituted for hand operated machines, or if semi-automatics, served by low rated help, are substituted for machines served by full rated mechanics, the expenses ratio to direct wages will rise. Yet again, if by improving the shop services in regard to supply of material, drawings, tools, etc., the direct wages are reduced for the same output, the expenses ratio to direct ratio will rise. Who will say that these rises in expense ratio to direct wages indicate inefficient management, and yet there are men, in positions where more understanding might be expected, who will criticise the works management adversely on statistics that show an increased expense ratio on this basis. If this is the attitude of directors, the works manager is in a difficult position, because the facts he can point to in support of his own case are not reflected by the method of compiling the statistics.

The way of the reformer is hard enough anyway, if works reorganisation is his objective, but it is made impossible if statistics are wilfully misapplied to the results of his labour.

There is one way to apply statistics of works expenses to indicate with some fairness the efficiency of the management, and that is on the basis of the inclusive costs of the product as a whole. There is difficulty in doing even this usefully, unless there is some standard by which the costs themselves can be tested. Where the product is varied, and varies differently each year, the only basis left that will allow periodical comparison is the turnover of business, or totals realised from the sale of the product. Adjustments must be made before using these figures, as to products made, but not sold.

Beyond that the state of trade will affect selling prices differently in different years, so that the turnover basis is only an approximately fair basis for calculating the production oncost ratio; but it has the merit of showing the influence of production oncosts on profits, and no works manager can object to his work being criticised in that light.

This discussion as to production oncosts ratios has no reference to the application of works expenses to the works product. The

Adminis-
trative
Statistics.

**Adminis-
trative
Statistics.**

disclaimer is made lest there be any confusion to the reader who may be aware that it is not at all uncommon for the production oncost ratio to direct wages to be used for actually distributing the works expenses to the various orders.

The foregoing illustrations will serve to emphasise the necessity for careful consideration in the application of statistics generally.

p. 355.

With reference to making recommendations as to specific statistical abstracts, or surveys as they may be better designated, it is perhaps not necessary to attempt more than an outline of some of the surveys likely to be of general use. Each business will demand its own particular form of surveys, particularly as to production statistics. There will be an economical limit to the volume of statistics that can be dealt with, and the selection must be confined to the periodical surveys that can be put to proper use.

- F 115. Starting with the works expenditure, a survey of the fortnightly totals of the purchases, etc., will involve only a few minutes' work at each account period, and will be most useful in detecting the relative proportions and totals of purchases for special purposes,
- F 118. and purchases for stock purposes, also of the value of process and
- F 119. stock products.

- The other side of the matter, as regards material used, can be
- F 123. derived just as readily from the stock ledger.

By the aid of these two surveys, some control can be exercised as to the investment in stock practically continuously throughout the year.

The means that are thus given to the managing director to criticise the stock control efficiency of the works, also furnishes the works staff with the opportunity of demonstrating the efficiency of that control.

After all, administrative statistics should not be considered as designed to serve for adverse criticism, for the means that ensure fair criticism should as equally ensure the recognition of good work done.

- F 30. Turning to wages expenditure, the direct wages figures for each group of orders (sale and non-sale) in each department will be particularly serviceable in indicating the direction in which the works' energies are being absorbed. It will show the direct wages entering into non-sale orders.

p. 450.

The secondary wages figures will be of special value and should be expressed as a ratio of the direct wages (machine and hand together) for each department.

The amount of the overtime expenses will be also a portent of some significance.

Again the total production oncosts, representing the application of works expenses to the work-in-hand, can be advantageously used by working out the percentage that each departmental total is of the grand total and making comparison with previous periods. Administrative
Statistics.

The comparison of percentages for successive periods can then be usefully plotted on squared paper to give a visual or graphic representation of the relative burden of works expenses that is carried by each department.

For the purpose of obtaining a bird's eye view of expenditure in relation to turnover and to keep track of the tendency of the business to be losing or making money, two charts are desirable,

- (1) Works expenses, as incurred, compared with production oncosts, as applied to the work in hand.
- (2) Total production costs of orders delivered plus commercial expenses, as incurred, compared with net sales or turnover.

The first chart is illustrated on the upper part of the next page, and is assumed to be plotted every fortnight—dependent therein on the period adopted for the cost accounts. It is necessary that the works expenses totals used for this purpose include such matters as depreciation and interest on capital. If the total works expenses at any point of time exceed the production oncosts applied to the same date, then the cost returns of total production costs will be erroneous, and any application of cost returns to the purposes of the second chart above mentioned is subject to reservations accordingly. If the production oncosts applied exceed the works expenses incurred, then there is still an error to be allowed for, but in the opposite direction.

p. 551.

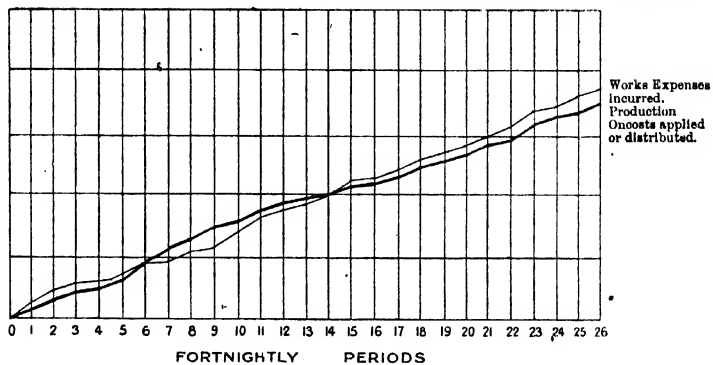
This chart is of particular importance because production oncost rates, if carefully determined for normal conditions, can provide a basis for testing production efficiency unless conditions of manufacture materially change.

Similar charts can be constructed with advantage for each manufacturing or producing department, using, instead of the total works expenses as incurred, the total of works expenses as apportioned to the respective departments, in other words the departmental share of the total works expenses. The production oncosts as applied to the department's work will be obtainable from the wages allocation weekly summary. F 135.
F 136.

F 30.

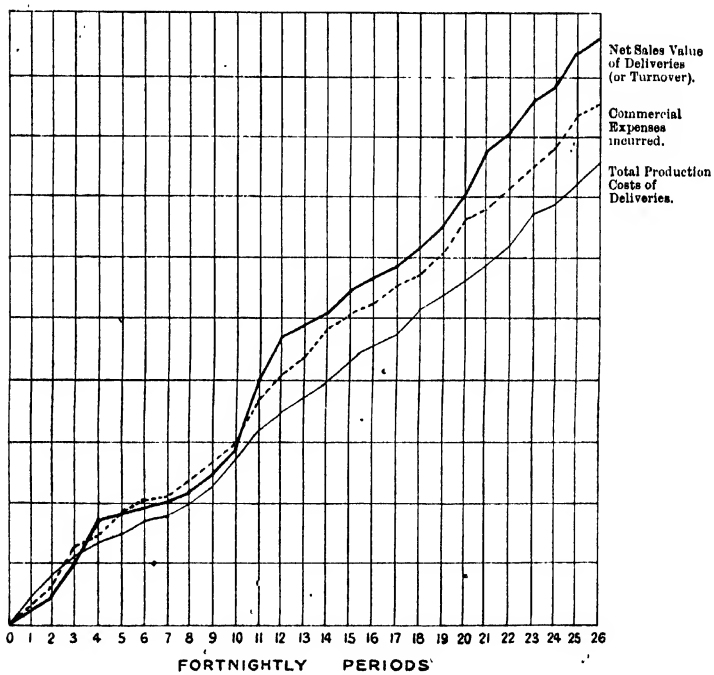
The lower diagram on the next page illustrates the chart requisite to meet the conditions set out under (2) above.

Fortnightly periods are again assumed. The figures for the delivered order costs for each period, as also for the net sales values,



STATISTICAL CHART No. 1.

Works Expenses incurred and Production Oncosts applied.



STATISTICAL CHART No. 2

Production Costs, Commercial Expenses and Net Sales or Turnover.

are obtainable from a summary on the lines of the specimen delivered orders cost abstract.

Statistical
Surveys,
F 138.

The totals of commercial expenses incurred in each period are shown as added to the production oncosts. While it may be true that some of these commercial expenses have reference to incomplete orders not covered by the chart, it is safer to take the line that current sales ought to meet current commercial expenses, or at any rate that no profit is being made unless they do.

In proceeding on these lines uncompleted orders are not allowed for as affecting profit to date. Other methods of control are necessary to ensure that orders in progress are not costing in excess of the amount provided for when fixing the selling price.

The comparison of estimated costs with actual costs is referred to on p. 41. This comparison can be usefully developed to deal with classes of product, during a given period, in the form of a chart.

In every business there will be a variety of statistics that can readily be resolved into chart form, but no general recommendations can be made, as the value of any chart must depend entirely on the use made of it. It is easy to be deceived into the construction of charts, or graphs as they are sometimes called, to gratify the eye rather than to affect the exercise of executive judgment.

WORKS MANAGEMENT

II

PRODUCTION CONTROL

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II A

BUILDINGS AND PLANT

• SELECTION AND LAY-OUT

In the selection of site, there is the question of locality generally and the choice of a particular site—in regard to which questions of subsoil, water drainage, etc. may or may not be large matters. In any case, a professional survey is a desirable preliminary to reaching any decision just as legal investigation as to title should and always does precede purchase.

Apart from the physical aspects there are several outstanding administrative factors to be kept in view :

- Availability of labour—particularly as to skilled workers in special trades.

Facilities for either the comfortable housing of the workers or their ready transportation from their homes in other convenient districts.

Power supply—particularly as to the possibilities of purchasing electricity in bulk.

Transport and supply of raw material to the factory.

Distribution of manufactured products.

There can be little question that consideration of the workers' domestic amenities—as apart from bare necessities—ought to be a first consideration in the selection of a factory site. The point needs no sentimental stressing ; sufficient to remember that not only do home conditions react on the intelligence exercised and the interest taken in the day's work, but given congenial conditions at home and at work there is a far greater inducement on the part of workers to stand by their adopted employers—to the advantage of both sides, by obviating the waste that arises from frequent changes amongst employees. The issue raised is a far-reaching one which cannot be traversed here, but the motive should be the greater development of each worker's capabilities by better environment, to his own material and mental advancement.

**Selection of
Factory Site.**

If Labour is in truth a partner in industry, let each worker cultivate the sense of personal interest and personal responsibility, and each employer hold it to be his duty, as it is certainly his interest, to do his part towards Labour becoming an intelligent constructive partner rather than an ignorant destructive partner. This may seem injudicious moralising concerning an apparently strictly economic question of factory site selection, but it is obviously easier to give proper weight to labour considerations before selecting a site than afterwards.

In large works and works handling material in any bulk, railway sidings are a necessity for the efficient transport of supplies and coal, and the despatch of the manufactured product. On the other hand, under present tendencies, a water frontage will be increasingly valuable in the future, for although water borne traffic is slow in transport, the economy effected is a large factor. With the probable reorganisation and development of waterways and canals, their efficiency should be increased.

**General
Arrangement
of Factory.**

In any case the main facility for transport of the necessary supplies will be the determining factor governing the general lay-out of the works with regard to the site.

Where there is much road transport, it is essential to provide ample receiving and loading platforms with docks of sufficient area to take the largest lorries. In all cases the works must be planned with ample storage accommodation so that the raw material is received near the shop and the sequence of operations or manufacture follows in buildings so arranged that the progress is unbroken and the manufacture finishes near the point of despatch. Ample warehousing accommodation will enable packing and despatch to be conducted with a minimum of handling.

p. 275.

The actual sequence of departments from receipt of material to despatch of product is a matter of great importance calling for very careful consideration. Similarly the geographical relation of the terminal points reacts on administration. A strictly straight line treatment may not therefore be as sound in practice as a horseshoe arrangement with external traffic control brought together, both as to goods received and goods despatched, in one area. For instance a railway siding would probably be best placed across the poles of the horseshoe, serving both stores and warehouse.

The power house should be placed to avoid any unnecessary handling of coal, and where possible the sidings should be so arranged to enable delivery to be made direct from the truck to the coal bunkers—though the lack of suitable trucks often operates to nullify this economy.

The general offices should be placed conveniently near the highway for the convenience of visitors, but should also be planned with regard to facilities for the management to get easy access to the various shops. **General Arrangement of Factory.**

The general lay-out must provide for the works entrance gates to be as near as possible to the various shops and should allow ample space for recording the times of arrival and departure of the workers so as to avoid congestion and consequent loss of time.

Facilities for interviewing applicants for employment, the payment of wages, accident treatment, etc., are equally with time recording and gate control, factors in labour administration. **Labour Administration Building.**

It is desirable to place these and other offices pertaining to labour administration in a separate building apart from the general offices and near the works entrances; and, in this connection, to provide a conference room where committees may meet and the works manager or managing director receive deputations, etc.

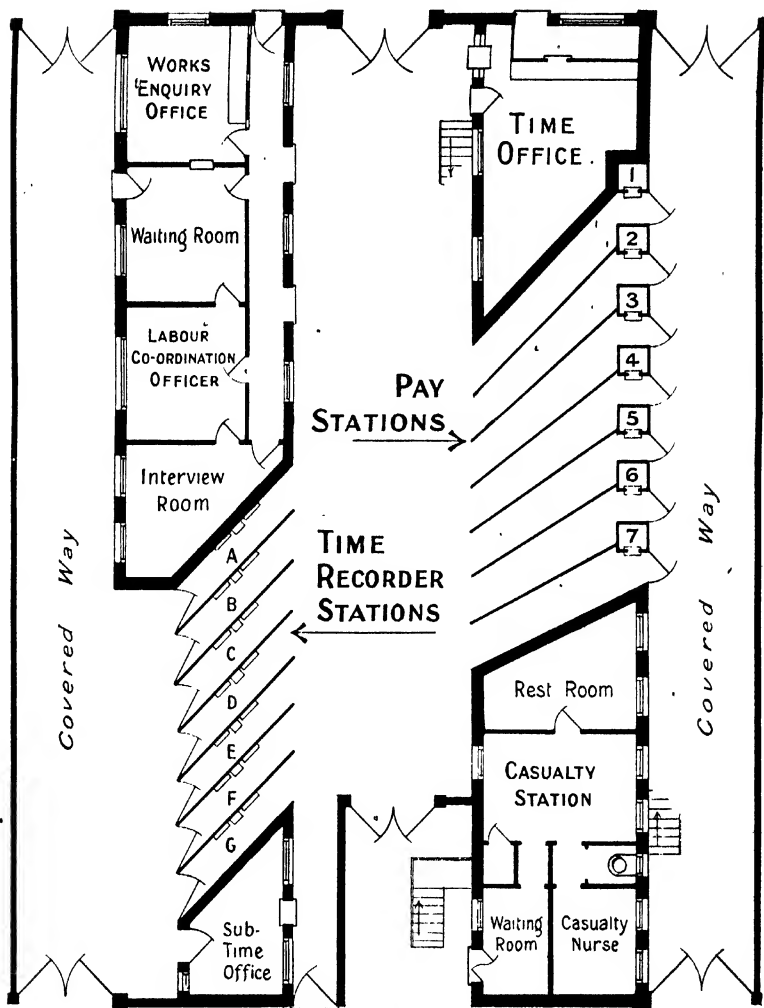
A diagram sketch is given on the following pages to illustrate the possibilities of a labour administration building. It is not taken directly from actual practice, but reflects actual experience where the principles have been applied with marked success though subject to severe geographical limitations. The question of having space available for what many managements will think an ambitious scheme lessens the likelihood of its general acceptance, but if labour administration is to be carried out in the right spirit altogether more recognition must be given to the self-respecting requirements of labour.

The considerations that arise in this connection are dealt with under the heading of Labour Administration in section III, page 171, *et seq.* They will be found to have a sound economic basis while serving to provide more dignified conditions.

Having regard to the heavy charges on account of labour, material and transport, the question of building costs is a very serious one, and requires the most careful consideration. The form of construction to be adopted must be settled in the light of these conditions in conjunction with the opinion of the management as to its being the most suitable to the class of manufacture under consideration. **Form of Factory Construction.**

The most usual forms are :

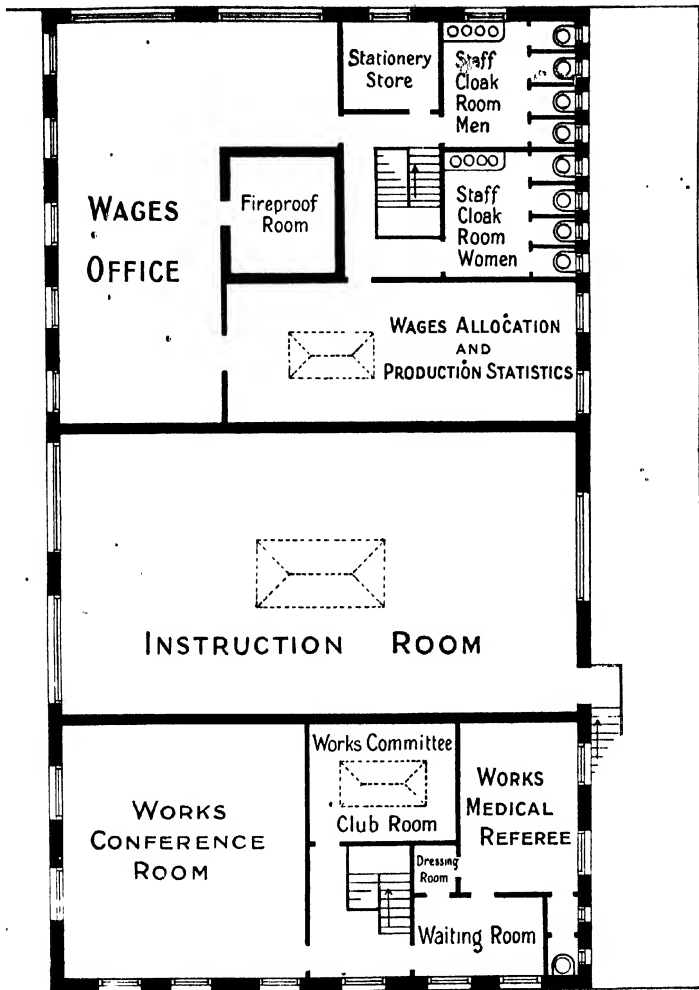
- Brick.
- Combination of brick and steel.
- Steel frame.
- Reinforced concrete.
- Steel frame and metal enclosures.



DESIGN FOR LABOUR ADMINISTRATION BUILDING.
GROUND FLOOR.

[III A—p. 191—Labour Co-ordination Officer.]
 [III D—p. 230—Accident Treatment.]
 [III F—p. 239—Works Enquiry Office]
 [III G—p. 247—Works Regulations.]

[V C—p. 340—Functions of Timekeeping.]
 [V C—p. 341—Time Recording.]
 [V C—p. 344—Punctuality.]
 [V F—p. 362—Payment of Wages.]



DESIGN FOR LABOUR ADMINISTRATION BUILDING.
FIRST FLOOR.

[III A—p. 188—Works Co-ordination Committee.]

[III D—p. 213—Works Medical Referee.]

[III F—p. 240—Apprenticeship.]

[V D—p. 348—Job Records.]

[V F—p. 360—Wages.]



DESIGN FOR LABOUR ADMINISTRATION BUILDING.
ELEVATION.

**Form of
Factory
Construction.**

The main points in connection with the foregoing forms of constructions are as follows :

Brick.

The adaptability of brick construction and rapidity of erection in one-storey shops of large area commends itself as being the most suitable and economical method in localities where bricks are easily obtainable. Further, with the use of steel roof principles to carry nothing but the weather covering the spacing of steel stanchions can be standardised to suit the requirements of the machinery involved in the processes of manufacture, the long walls being so readily stiffened by piers wherever necessary.

Combination of Brick and Steel.

The former remarks apply to this form of construction with the additional advantage of being able to divide the shops into any requisite number of bays and the rapid and economical erection of partitions formed of concrete slabs, which would receive their necessary stiffening from the steel stanchions and roof girders.

*Steel Frame.*Form of
Factory
Construction.

This form has many advantages in areas where the ground is limited and it is necessary to get the requisite floor space by a number of stories. The loads being all carried by the steel supports, the brickwork of enclosing walls can be of much less thickness than would be necessary were the loads being carried entirely by the walls themselves, and is in fact only a protection from the weather and to act as a fire resisting protection to the steel.

Reinforced Concrete.

This method is being largely used either as the sole method of construction, in which case the building is practically monolithic, or else in conjunction as floors and supports to one of the former methods. Where ballast is plentiful or easily obtained, it is probably as economical as any, the cost of the labour in centreing and strutting for concrete being discounted by the material being mixed and handled in bulk. A building of this character is, of course, not so readily altered to adapt for any other purpose than its original one, and it is here that co-operation at the stage of sketch plans should prove particularly valuable. The depth necessary for the floor beams, where heavy stresses are set up, is also a large factor in some cases for consideration as against other methods.

Steel Frame and Metal Enclosures.

This method can only be regarded as a temporary form for emergencies—the corrugated steel shed. The large cost of maintenance and the difficulty of maintaining the temperature are much against it, and in many districts the use of this form would require the special approval of the local building authority.

In the London County Council area, governed by the requirements of the London Building Acts, and in some town areas, it must be remembered that buildings for trade or manufacture are limited in extent to 250,000 cubic feet and must be divided by party walls into divisions not exceeding this. Openings in these walls must have double iron doors and are limited in size and number, and the provision of these requirements in the most suitable position requires serious consideration.

Building
Bye-Laws.

Much could be appropriately written on the subject of local building bye-laws, but space forbids and in any case these bye-laws are not always conceived with the narrow-mindedness with which local officials sometimes seek to carry them out. It may not demand

**Building
Bye-Laws.**

an excessive patience or expense to get a sound design of factory accepted by the local authorities if set about in a competent manner—whatever the bye-laws seem to say.

Lighting.

The shops should be planned so that as much of the external sides as possible consists of windows and every attention should be given to procure as much natural light as is possible. In many cases where the buildings consist of two or more stories the initial cost of providing some form of prismatic glazing in the upper parts of the sashes will be quickly saved by virtue of the additional light acquired.

In one-storey buildings the arrangement of them east and west will allow for glazing in the north slopes, thus providing an effective steady light free from the direct rays of sunlight, obviating at the same time the necessity for darkening the roof-lights in the summer months.

In any case, where there is direct entry of glaring sunlight it will repay the cost of mechanical means of shading by reason of the comfort and sense of coolness ensured.

The question of artificial lighting deserves more careful consideration than it sometimes receives. The efficiency of a well-lighted shop is marked, and is a stimulus against the depressing darkness of the autumn and winter months, which so reacts on output.

In cases where vibration is set up by machinery the use of incandescent gas is liable to prove expensive owing to mantle troubles, and the use of electric lighting will probably be determined upon in shops where work can be carried on under a "diffused" system.

The convenience of balance-weighted lights on close operations enables the operator to place the light as most convenient to himself and so makes for comfortable working conditions. In any system, however, it is false economy to limit the supply of lighting facilities, and an excess of points should be rather aimed at.

**Heating and
Ventilation.**

p. 194.

The question of heating and ventilation presents some difficulty to provide for same being efficient without creating draughts, and the careful study of the problem will be more than compensated for when the result is a warm, healthy and comfortable shop.

In the cases where radiators can be placed under windows and the air admitted from behind same and so warmed on its entry, hot water would seem to be the most economical and effective, the air being changed by means of exhaust flues.

This, however, is not the case where there are roof lights, the warmed air on rising becomes chilled on the glass and the tempera-

ture drops rapidly, thus causing draughts on the workers and much consequent discomfort.

Heating and
Ventilation.

In such cases where there is a supply of steam, steam heat would appear both economical and efficient, the pipes being placed up near the glass. The air being warmed at that level will circulate without draught.

The number of latrines will depend upon the number of workpeople, but care should be taken to place them in relation to the number required by the various shops and where possible should be built near the shop. If placed in the shop itself they must be next an external wall and have a thoroughly ventilated lobby between them and the shop; this arrangement, however, obviously takes very valuable lighting area from the shop with the only advantage of affording, perhaps, closer supervision facilities by the foreman against loitering.

Sanitary
Accommoda-
tion.

p. 194.

p. 263.

Personal understanding of the management with the workers finds one important expression in the holding of mass meetings and facilities for this purpose should not be neglected. Requirements for lectures and recreation have also to be considered. A canteen is likely to be the cheapest, perhaps the only provision that can be made. In this event, the canteen should be designed to suit the dual purpose.

Canteen and
Assembly
Hall.

p. 268.

As to the necessity otherwise for a canteen, this must depend on the accessibility of the workers to their homes at meal times. With the adoption of a single-break day arising out of shorter hours, the question is simplified as many workers can get home when there is an hour's meal time who could not think of it in the breakfast half-hour. A design for a canteen is illustrated on page 168.

Foremen's offices may seem a minor matter, but nothing directly affecting labour administration can in future be treated permanently as a minor matter.

Foremen's
Offices.

p. 159.

A foreman is the deputy of the management in effect, and his office should consort reasonably with his responsibilities without being inappropriate to workshop conditions.

It should be so constructed as to allow some sense of privacy as to interviews with workers and any rank of staff, but in common with what should obtain in all staff offices, should not be screened off by opaque or painted glass.

On the other hand, to place a foreman's office on a raised platform so that he can overlook the whole shop is out of date, to say the least. As an attempt to uphold discipline and attention to work,

**Foremen's
Offices**

it will largely fail, seeing that the foreman can be watched as being in his office and, at a relatively short distance, be deceived by a pretence of working. Again, while supervision was never more vital to the real welfare of all in industry, yet it must find expression through other channels than the mere presence of foremen or managers. Primarily supervision should operate in a sympathetic atmosphere in that the worker should benefit personally and directly by assiduous attention to his work. The foreman should be there to guide the worker in his work and help him earn rather than to make him work. Even if a foreman's main function were to watch the workers to see that they work, he could exercise it better by his comings and goings not being advertised by his office being a sort of pulpit.

**Selection of
Plant.**

In reason it is hardly possible to place too much importance on the care and discrimination required in the selection and lay out of plant, not only from the standpoint of initial cost but also of suitability as affecting the cost of manufacture of the product concerned. The costliest machine, however well designed, is not necessarily the right one for a particular purpose, while on the other hand cheap machines can be dear at any price.

The first step to be taken in the selection of machines is to make a study of the product to be manufactured in the light of the quantities to be made, bearing in mind the class of labour available and local trade practices. The possibility of increased output being required necessitating extension of plant should be borne in mind, although obviously, excepting an increased demand be a certainty, only the immediate requirements should be arranged for.

A very complete knowledge of shop work and of the capabilities of the various types of machines is essential so that discretion may be used in accepting or rejecting plant that is unsuitable in design or unduly costly.

By some concerns the question of the acquisition of new machines is little more than one of trade description and price, and is not infrequently put in the hands of the drawing office. The results, as would be expected, are rarely satisfactory.

To give an example, one might take the milling machine. Milling machines are made in many different types from the single purpose cross-milling Lincoln type machines to the universal milling machine, with a difference in cost of 3 or 4 to 1. It is by no means uncommon, however, to find the more expensive types of milling machines being used regularly and exclusively on operations which could be done with equal efficiency on the cheaper single purpose machine. The result is the initial capital expenditure has been greater than

necessary with no corresponding increase in production. On the other hand, however, it is frequently the case that the low-priced machine is not the right machine to purchase, the more valuable machine being essential in the interests of economical production. Failure to have the courage to make the more expensive purchase will reduce the initial outlay at the expense of permanently reduced or otherwise unsatisfactory output.

The works manager must finally decide as to what machines should be purchased but the programme of requirements should be drawn up by the production estimator where such an officer exists. By virtue of his daily duties, he is in a position to advise and if necessary to decide what are the best machines, for the purpose, their capabilities and output.

Ensuring by these means the right selection, the next question is that of lay-out. This is an all-important question inasmuch as alterations, if required as the result of afterthought, can only be effected at an increased cost in time and money, or if required and not made, then there will be a permanent drag on output and permanently higher cost of handling.

It might therefore be said that the possible efficiency of a shop can be decided before a single machine is laid down. The question of arrangement is one, however, which must be separately settled for each individual works. The ideal, of course, is for the material to be brought into the shop at one door and be passed from machine to machine until manufacture is completed—no ground to be passed over twice and a minimum of handling to be necessary. This is not necessarily an impossible proposition where the product to be manufactured is one of few pieces and is to be turned out in large enough quantities to enable each process to be carried on without interruption. Under such circumstances machines may be laid down in the required sequence of operations and the pieces can be passed from machine to machine with a minimum of labour; in fact, the putting down of the piece, as one operation is completed, may easily be a suitable picking up place for the next operation.

As soon, however, as one machine needs to be used for more than one operation or piece, this ideal is destroyed and accordingly as the ideal is departed from, so do considerations of another kind become necessary. It is difficult to lay down any rule in this respect but the underlying principle of all arrangements must be the convenience of handling the product generally; the heavy pieces from the standpoint of transport between operations to be treated as of first importance. This usually means a compromise

Selection of
Plant.

Plant
Lay-Out.

**Plant
Lay-out.**

between those arrangements which may be best for individual pieces but this is in very many cases unavoidable.

Facilities for re-arrangement, particularly as to having interchangeable counter-shafting, ought to be kept in view from the start. There are shops on mass production with all the machines driven off the shafting without the intervention of counter-shafting. In some cases, machines are fitted up for different operations and tried in a special department and transferred bodily to the manufacturing department, thus carrying the interchangeable idea a stage further.

There are more than enough shops where each additional machine seems to have taken whatever vacant space there might be, often with special expenditure in the way of drive and installation, with an ultimate atrocious conglomeration of machines—all arising from want of facilities or want of courage to rearrange the machines as additions called for. Obviously these are questions where adequate experience may bring to bear a very valuable criticism of the initial lay-out and save much needless expense in future developments.

The outline plans drawn to scale on card or stiff paper, as used for arranging a machine shop lay-out on paper, when not in use, can very well be kept attached to the respective plant record cards.

II B

WORKING DRAWINGS AND COMPONENT SCHEDULES

WHILE design is a necessary preliminary to the manufacture of any article it is practically only in engineering that it remains a constant factor and the following discussion has therefore more particular application to the design of machinery.

p. 6.
p. 17.
p. 276.

Designing is hardly synonymous with invention although the efficient designer must have inventive ability. More frequently the application of this ability is in what may be termed a geometrical direction as to proportions, combination and arrangement.

On the other hand designing largely arises out of the application of inventions.

The design of machinery as a commercial proposition, is largely a matter of evolution, of development virtually by the process of trial and error. The basis of trial should be calculation,¹ but trial alone can hall-mark the design.

A good deal of designing is done on false premises in that previous designs are used as the basis for new productions, either because they are accepted in the trade as orthodox or have not definitely failed in service. For this reason, to prevent unconscious perpetuation of uneconomical or inefficient designs, calculation should be recognised as having an importance as undeniable as the necessity for experience.

In designing any machine the main considerations should be :

Efficiency of the machine when constructed.

Economy of material required for its manufacture.

Economy in cost of manufacture.

The question of standardisation largely influences economy in cost of manufacture and the extent of its application hinges almost entirely on the manufacturing policy adopted.

¹Each designer or draughtsman should be provided with bound books in which to record calculations. The notes should be legibly entered, and the books kept carefully for reference. They should be large enough (say foolscap size) to make loss or misappropriation difficult.

Design

Standardisation in design does not appeal to a designer as a controlling influence on his work, as it tends to rob him of the stimulus that lies in efforts in new directions. An ultra-cautious attitude in the inception of a standard design and a firm stand afterwards against alterations, unless absolutely forced by some unforeseen failure in service or to meet some definite trade requirement, are practically imperative conditions for production efficiency and, in the long run, of financial success. Courage to make improvements needs to be coupled with courage to carry through the proposed improvement as an experiment before incorporating it in any standard product. Ingenuity in the direction of alterations should be at a discount when designs have been established, and the proper striving after greater efficiency in design must be somehow synchronised, as to its effect on design, with the experimental or development stage prior to adopting a completely new design. The point is to make no improvements without due deliberation, and only at the appropriate moment, so as to conserve the true interests of production and the general selling policy. Lack of method or organisation often prevents this truism becoming effective, without there being any set intention to ignore considerations pertaining to production.

Some manufactures seem never to have had an initial development stage, and designs are perpetuated that reflect equally the lethargy of the manufacturer and of the buying public.

This fixity of design might be expected to help production, and so far it does, but so far as it is associated with inefficiency in design, cannot be a sound manufacturing policy.

The impetus to improvements in design should frequently arise from the endeavour in the works to produce efficiently, and these suggested improvements, alike with those arising in the drawing office or from tests, must wait their proper time for incorporation. A suitable routine requires to be established whereby all desirable improvements shall be reported to the drawing office and recorded there in a manner not likely to allow them to be overlooked, when fresh manufacturing orders are being placed.

Standardisation does not necessarily mean that the product as a whole shall be stereotyped, but rather that every detail possible shall be in accordance with an approved range of standard shapes and dimensions. The principle is no more than that involved in adopting a standard screw thread instead of a non-standard one.

The British Engineering Standards Association have already covered a very wide field and approved a large range of standards affecting design in practically every branch of engineering. The adoption of these standards by each manufacturer so far as is

possible and necessary must make for great reduction in costs, by Design. allowing standard components to be made in large quantities for distribution amongst the trade or alternatively to widen the application of standard tools.

There must always be a number of details capable only of local standardisation.

The approved range of standardised fittings and details should be F 39. 36p. 22. tabulated, and bound volumes of duplicates loaned to each draughtsman for every day reference.

In some offices designs are drawn out in outline as the designer would have them, were he free to choose, and then a checker goes through to indicate the standard components to be used—necessitating a recast of the design and a possible loss in appearance with a big gain in production economy.

Standardisation in component design will be facilitated by grouping together prints of components of similar shape, apart from purpose. This pre-supposes that unit drawings of the individual component are available.

The following are a few typical classes under which these designs may be grouped—with subdivisions as necessary to facilitate reference :

Shafts.	Bolts, Nuts, Washers and Fastenings.
Couplings.	Gear Wheels.
Levers, Links and Fork Ends.	Flashes.
Brackets.	Stuffing Boxes.
Covers and Doors.	Liners, Adjusting and Distance Pieces.
Springs	Pipes, Flanges and Connections.

As the data accumulates, the main dimensions can be tabulated on design comparison sheets and incorporated in the draughtsman's F 40. reference book.

When any one component is applied to various products the problem arises of keeping a historical record of these applications, also as to corrections and changes, metals and so on. To this end separate component history cards will be the most convenient F 42. means.

This record can be usefully extended to include notes of points calling for consideration before further application is made of the respective component, such as those mentioned above as likely to be put forward by the works as the result of experience in manufacturing.

Associated with such a record should be a synopsis of complaints arising under guarantees and in connection with repair work. This may necessitate a daily report of "parts complained of" from F 43 the repairs department to the drawing office, or alternatively made up in the drawing office from the letters of complaint.

An important feature of standardisation in design is the adoption

Design.

of a limited range of materials as far as is practicable, as this has a considerable influence on purchase costs and stock requirements.

p. 139.

Perhaps the feature in design likely to be most easily fruitful of economy in production is adherence to dimensions for which standard tools and gauges are available. Standard in this connection may mean only local standards, but should preferably mean standards in general use, as this enables tools to be bought outside when manufacture of the tools in the works might be too inconvenient, just as it will frequently be too costly, if costs are counted properly. Facilities have been increased latterly for buying special tools also, with possible gains in point of both quality and costs.

These and other points directly affecting the methods of production point to the wisdom of close collaboration of the designer with the foremen of pattern-shop, tool-room and machine-shop.

Similarly, too, the designer needs, frequently, to follow new jobs through the shops, more especially at the fitting or assembling and erecting stages.

The checking of patterns, for instance, by the designer himself is an important education to him, and should be carried out if possible.

Considerations such as these strongly support the principle already advanced that design should be under the same control as production of which it is an essential part.

The application of any of the points made above to special product must depend on circumstances. Product may be taken as being special when subject entirely to the customer's specification. The range possible in the manner of this class of specification is so wide that discussion is rather futile beyond remarking that in any specification, short of scaled drawings or samples, that may on no account be varied, there will be scope for applying some measure of standardisation in preparing the drawings for the works.

Functions of Drawings.

The functions of a drawing are to convey dimensions and arrangement so definitely as to enable the desired product to be properly made and economically assembled, without any calculations whatever being necessary in the shops.

These functions are still not adequately appreciated in some drawing offices, although the position generally has much improved of late years. The shop calculations entailed may be simple in involving only a totalling of dimensions or it may be more complex as, for instance, having to determine the exact diameter of a bevel gear blank. The designer has to make all the requisite calculations in the first instance but is either indifferent or is insufficiently appreciative of shop requirements to give all the dimensions that ought to be given.

Even when a drawing is so far complete as to obviate all necessity for shop calculations, it still remains for the dimensions to be sufficiently definite for the conditions of economical assembly to be met. Functions of Drawings.

Views will differ as to what are definite figures. Quite frequently the patternmaker will permanently fix dimensions, that will approximate to, rather than be identical with, the drawing. Apart from the pattern there may be fluctuating variations of dimensions in the casting. While these variations may be no more than is quite acceptable, there are occasions when the permissible variation may be too serious a question to be left to the patternmaker's discretion. Obviously, however, it is a point in good design not to set up needlessly difficult conditions in production. p. 166.

The subject of machining allowances on castings and forgings calls for careful consideration. In general these allowances err on the heavy side.

The real problem of dimensions, more commonly, is one of machined surfaces, and here again the various machinists concerned could very easily interpret the drawing dimensions so differently as to set up difficulties and consequent expense in assembling. The accumulated experience of the shops as represented by the foreman and others, goes far to obviate these difficulties, by working within certain limits of error, or variation from drawing size. Whether the permissible variation be large or small, the fact remains that the dimensions given on the drawing are very rarely reproduced exactly in the product. It might be said that they are never exactly reproduced, inasmuch as there will be some fractional error of workmanship in the best work. Where two or more component pieces have to fit or work together there will need to be a certain difference of dimensions to allow of that fit or working. The necessity may be that the components shall drive one into the other, as a flywheel on a shaft; that the components shall slide one within or over the other, as a piston rod crosshead and slide; or that the components shall revolve one within the other, as a shaft in its bearing. Equally, of course, it may be a necessary condition that two machined surfaces shall be in close proximity but shall not touch. It is convenient to insert here three definitions of terms appropriate to any consideration of dimension limits.

Tolerance.—A difference in dimensions prescribed in order to tolerate unavoidable imperfections of workmanship.

Allowance.—A difference in dimensions prescribed in order to allow of various qualities of fit.

Clearance.—A difference in dimensions prescribed in order that two surfaces may be clear of one another.

Functions of Drawings.

Enough has been said to bring out the point that definite figures, in the way of dimensions, may involve in actual production a skilled interpretation of the nominal sizes usually given on the drawing. The extent to which the correct interpretation shall be registered on the drawing, or left to the shops to supply from their experience as often as required, is a matter upon which managers will differ.

Another highly important point arises over the interpretation of drawing sizes, namely, the production of replace parts from a drawing. If the final interpretation has been left to the shops, without any records being kept, the suitability of the replace part, in regard to the important dimensions, will hinge on whether the shop habits happen to operate the same way as originally.

In one sense there are no clearly definable shop habits of accuracy, except so far as an inspection and viewing department may apply a settled standard in the matter before passing the work. Here again the viewers may have a different idea from the foreman or the mechanic as to the proper dimensions, or rather the permissible limits of dimensions in a given case.

p. 140.
p. 166.

As a matter of efficiency, there would seem no doubt that the correct interpretation should be permanently included on the drawing. It is not, however, always expedient to attempt this course, firstly for lack of practical knowledge on the part of designers, and secondly for lack of courage on the part of managers to face the trouble and expense of settling the proper tolerances, allowances and clearances for each and every component. While tables for size limits for various classes of work are invaluable for regularising the production practice, it is dangerous to adopt any tables for arbitrary application. Each case needs to be treated on its own merit, and limits laid down accordingly. The quickest course may be to adopt suitable tables of size limits for the various classes of work, and arrange for all instances of the scale not applying to be registered in actual dimensions on the drawing.

It will be understood that the usual course in applying a table of size limits is to institute limit gauges with "go" and "not go" dimensions, the difference between these two representing the permissible tolerance. In the absence of limit gauges, micrometers may be used provided that the permissible variations in dimensions are set out against the nominal dimensions on the drawing. This practice is to be recommended even if a table reference is also quoted.

When the shop staff have to settle these matters, they need to be reminded of the intended application of each part as to the class of fit required. To this end drawings should be issued showing

the parts assembled. This means usually a drawing that is not easily read, and in no sense convenient for machining purposes. For production purposes the ideal way is a unit drawing of each component, independently dimensioned, so that the machining processes shall be facilitated, mistakes avoided, and an efficient service of drawings to the workmen made possible—the borrowing of shop drawings being almost obviated. Machined surfaces should be tinted, say in red, and in the absence of a proper scheme of dimension limits the more important dimensions may even be starred, to help toward the proper interpretation of the drawing. This will serve to settle the proper machining allowances on castings and forgings.

Functions of
Drawings.
p. 102.

These unit drawings, however, require to be amplified beyond the giving of nominal sizes, and the classes of fit and finish required must, therefore, be indicated on each. This work can be done and under most conditions it will pay to do it, though it means considerable stress on the works manager and chief designer to get such a scheme thoroughly established, and draughtsmen trained accordingly.

There will, in any case, be the necessity for drawings to be issued for assembling purposes, showing groups of components fitted together. These assembly drawings ought to be built up to correspond with the respective assembly unit found convenient for fitting up prior to final erection.

Such assembly units should be in themselves standard, although possibly entering into various complete products, which may again be subject to the variations in customer's specifications. The scheme of standard assembly units is particularly applicable where the customers' special requirements can all be met at the erecting stage—where usually it only pays to meet them if efficient production is given adequate consideration.

Drawings used at one time to be made always to serve as the medium for issuing instructions as to materials of construction and the quantities required, and until latter years the shops had to count up the details requisite to make the specified "Number of sets off."

A drawing reference should have a wider significance than being merely a means of identifying the drawing—it should be considered as a means of positively identifying the product made in accordance with such drawing.

Drawing and
Product
References.

Schemes of classifying and numbering drawings should be determined therefore in the light of their service in the works not less than in the drawing office.

**Drawing and
Product
References.**

The range of drawings to be provided for in most drawing offices is substantially as follows :

- Works buildings and lay out or plant arrangements.
- Works Machinery.
- Works Tools.
- Standardised Fittings and details.
- Saleable products—standard.
- Saleable products—special.
- Experimental and provisional designs.

In the case of works buildings and machinery, the identification of the work covered is usually only of passing moment but there is likely to be an advantage in filing away together all drawings pertaining to each department. It is convenient for administrative purposes generally to identify departments by letters as A, B, etc. If this is done, the buildings drawing series can be marked BA1, BB1, BC1, etc.—(B for Buildings, A, B, C, etc., for departments.) Similarly for machinery drawings MA1, MB1, MC1, etc. It may be helpful in some cases where several drawings are involved in one design or scheme, to keep the same main reference with subsidiary symbols for the separate sheets, as MA2a, MA2b.

In the case of works tools, covering in that term all loose plant, and therefore jigs, fixings, gauges, cutting tools, etc., the most important point on drawing references is to distinguish between standard tools and special tools. Tools are special when they are specifically designed for the manufacture of a particular component and are not of general application. Standard tools in this connection are tools that are accepted as standard in the works in question because of their general application and need not necessarily be in accordance with any trade or outside standard, though obviously economy would dictate that they should be so as far as possible. A convenient distinction in marking the drawings would be TS1, etc., (Tools, Standard) and TN1, etc., (Tools, Non-standard). It should be borne in mind that it is advisable that the tools should be permanently identified by being actually marked with these references so that if more than one drawing is necessary in one tool design, the same reference should apply to all with a subsidiary symbol to indicate the separate sheets, e.g., TS2a, TS2b.

p. 87.

Touching the drawing references for standardised details and fittings, it has been recommended above in discussing design that tables of standardised details should be made up for each draughtsman's use for controlling the design of complete products to the largest extent practicable.

F 39

It is desirable to provide a distinctive identification for these standardised items and the symbol SF (Standard Fittings) is convenient. The following are typical items likely to come in this category :

Ball Bearings.
Bolts and Screws.
Keys.

Lubricators.
Pins, Cotter.
Pins, Taper.

Nuts.
Studs.
Washers.

The range may easily be very extensive in some businesses and it may be preferred on that account to separate bolts and the like under a different reference, such as SB (Standard Bolts), but the principle is not affected.

As to exercising discretion over what to standardise in the way of fittings, the need for discretion is perhaps not so much as to actual standardisation, as to holding stocks of so-called standard items, that may only have a problematic use. Bolts, studs, and screws constitute a typical class in which the holding of wide ranges of stock is likely to be fraught with much risk of accumulating bad stock.

One theory in regard to standardisation is that fewer varieties and consequently larger quantities of the selected sizes will be used and production costs reduced accordingly. This is sound only so long as the requirements prove to be large. With bolts, for instance, the requirements of design involve, rightly or wrongly, such a wide range of sizes, more of course as to lengths overall and lengths of screwing, that to standardise each variation becomes absurd ; and to maintain more than a very restricted range of stock sizes is likely to prove a bad speculation—not merely in involving spending money on useless stock, but in preventing the shops being free to make the sizes that are wanted.

A convenient compromise may be found by marking with an asterisk those items on the standard fittings lists that are approved as stock items—all others being made only as and when required.

For many varieties of standardised fittings, all dimensions can be conveyed by table, although tables are not to be recommended for use as working drawings. The tables would be numbered SF1, etc., for each nominal size of fitting of any kind such as " $\frac{1}{2}$ " hex. head bolt, mild steel," and the varieties in length or other subsidiary dimensions that are tabulated under any one reference would be distinguished as SF1a, SF1b. There should be a diagram or sketch at the head of the sheet with letter references for dimensions. The respective dimensions would be set out in column form under the letter references used in the diagram or sketch.

A handy scheme for making inexpensive working drawings for each production order for standard fittings such as bolts and studs is to have skeleton rubber stamps for the various types, with

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References.

**Drawing and
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dimension lines embodied, so that the tabulated dimensions can be applied to the stamp impression with a minimum of labour. The impression can conveniently be made on the label used for ordering the work. This is likely to be much more economical in various ways than having to make a tracing, then a photo print, and hold same in a drawing stores in readiness for issue when required.

When a detailed drawing is necessary for a standard fitting, such as a lubricator, a cross reference on the tabular sheet to the appropriate drawing number is all that is required. There is nothing against using the SF reference for the detail drawing number, as there is no likelihood of confusion between the drawing and the tabular sheet.

Coming to the question of drawing references for saleable standard product, the first point to be agreed is the method desired for identifying components and from that basis to make the drawing references the same so far as is convenient.

p. 108.

In the works, the means of component identification require to be such as to lend themselves to being marked on foundry patterns, on jigs and special tools for producing the respective components, and further, on the components themselves, when made and sent into stores. The necessity for pattern numbers, or pattern marks, as they may preferably be termed, has been recognised in most works, though not in all, for very many years. The pattern problem is not so much the identification of the casting made from it in the first instance, and inferentially of the pattern itself in that stage of its existence, but rather the liability of the pattern being altered away from the original dimensions. A pattern mark has come, therefore, to mean only the identification of the pattern itself, and that in no precise way, and is not usually accepted as identifying the casting made from it. Pattern marks are, more usually than not, left for the pattern shop to apply; and are not recognised in the drawing office. Pattern records require to be kept with the utmost care as to every alteration made in any pattern, if much advantage is to arise from the drawing office making reference to any such records. In any case the pattern shop will have to verify every pattern, as meeting the drawing requirements, before issuing same to the foundry. It will be best, therefore, for the ordinary pattern marking as carried out by the pattern shop to be considered as holding good only between themselves and the foundry.

The foregoing remarks need qualifying when a component numbering scheme is adopted, for then the pattern should carry the component number in raised figures, which will serve all the functions of a pattern mark.

The modern conditions of efficient production control necessitate that each design of component shall have its symbol for identification that is independent of the wording or phrasing of the name description. This symbol needs to be of a style adapted for marking purposes. The older style of reference was to associate the name of the component in question with the drawing number of the general arrangement in which the said component figured. This did not necessarily entail any misunderstanding in the drawing office, whatever might be occasioned in the works.

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Product
References.

A name description is not only long but it is very difficult to establish standard names as a workshop habit.

The least alteration in dimension destroys the validity of a component reference, if the alteration prevents the altered part being used for repairs of the original part, and a new reference must be given to the varied design. This is sometimes felt to be rather a nuisance in the drawing office, but its necessity is very obvious from the production and stock point of view.

When the variation is only in the nature of material a change of reference may not, by itself, be sufficient safeguard against mistakes in assembling or erecting. A typical case is that of bolts which may be made of either mild steel or high tensile steel, both materials having the same appearance. Some specific difference in the machining, such as a small groove on some exposed surface, is therefore to be recommended when the variation in material is not obvious.

There are several systems in vogue for identifying components, of which the following are the more important :

(1) *By consecutive numbers from one common series.*

With possibly blocks of numbers set apart for particular products.

p. 98.

(2) *By consecutive numbers associated with the year of design.*

F 41.

Thus components designed in 1920, would take up numbers 20/1, 20/2, 20/3, etc. ; those designed in 1921—21/1, 21/2, 21/3, etc. This modification confers the advantage in trades where designs change each season, for example, in motor car manufacture ; of assisting in the control of stock by indicating the year of design, and at the beginning of a season serves to throw into prominence the components for which new manufacturing arrangements are necessary. The merits of the scheme are not very pronounced but in some circumstances the advantage over scheme (1) will be quite appreciable.

(3) *By consecutive numbers associated with the drawing number.*

Thus, if on drawing sheet 4211 eight components are drawn in detail, the sheet being sectioned up accordingly, then each section would take up a consecutive number, e.g. 4211/1.

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4211/2, 4211/3, etc. This is an arbitrary scheme, designed mostly to facilitate the filing of drawings. Of course, there is a virtue in associating in the minds of the shop staff related components but unless all the components of any definite group of mechanism or assembly unit can be drawn out on one drawing sheet, there will need to be several drawing sheet numbers to cover the assembly unit. Beyond that, when designs are modified and components with new references have to be substituted, the idea of one drawing "key" number is further interfered with and there can easily result, in a year or two, a medley of double barrelled numbers.

(4) *By consecutive numbers associated with the assembly unit references.*

Under this scheme the disadvantages of scheme (3) are at once minimised. If a given design of assembly unit—e.g., gear box of motor car—is given a reference number, e.g., AU301, and all the components serially numbered accordingly, as 301/1, 301/2, 301/3, etc., then however many drawing sheets are involved, there will be one key number for shop use. In the drawing-office the drawing sheets can be numbered 301a, 301b, 301c, etc. It tends to help production control routine if the principal or more complex components of each assembly unit are given early numbers so as to head any assembly list, that is list of components in any assembly unit. If the design of an assembly unit varies in any detail from a previous assembly unit, it should take up a new reference number else the value of the reference is altogether vitiated for production control purposes.

The only way, in the case of a modified design, to maintain simplicity of reference is to re-number all the components in accordance with the new reference for the modified assembly unit. Such a course means the issue of new detail drawings with a cross reference to the earlier assembly unit reference. It means a corresponding record in the tool stores and component stores. Although this suggests trouble and expense, there need not be much of either and the gain throughout the future course of manufacture can be very real. The retention of the original consecutive number simplifies alteration of records, thus the modified design of component 301/1 becomes say 396/1.

It is surprising the ease with which key numbers can be remembered and how much mental time they save—mental in the sense of focussing the mind at once on the right work.

p. 110.

When a detail becomes part of the design of more than two assembly units, the stage has probably arrived for standardising it and adding it to the standard fittings list, with a corresponding permanent reference independent of its uses.

(5) *By consecutive numbers in conjunction with design symbols.* **Drawing and Product References.**

This method finds expression in adopting symbols for the complete product, thus a certain sized hydraulic pump would be symbolised as HPA (HP for Hydraulic Pump, and A for its nominal size). Consecutive numbers are used for the components entering into the complete pump as HPA₁, HPA₂, HPA₃, etc. If designs always stood still, and if the range of products were small, the scheme might be justified but those very conditions would make a purely numbering scheme still easier. One point against letters is the extra range of stamps necessary for marking the components.

The effect of drawing references of the above schemes of identifying components varies and it is only in Scheme (4)—(*By consecutive numbers associated with the assembly unit reference*) that there is any relation between the shop requirements in the matter of facilitating production control and the drawing office requirements for filing of the drawings. For the rest, the drawing references or drawing sheet references are arbitrarily fixed in the drawing office to meet their own requirements only. It may be useful for them in those circumstances to prefix a letter to the drawing number to guide the classification of drawings in the storage cabinets.

The practice of using unit drawings for components, that is, a separate working drawing for each component design, confers so many advantages as to have become well established. These unit working drawings should bear the same reference as is adopted for identifying the component.

If, as it be supposed, these unit drawings are as small as practicable, say 10" by 12" or 8" by 13", the drawing office may elect to retain the full drawing sheet for their records and place a number of component drawings on one sheet—the print being cut up into sections for shop use afterwards.

Alternatively, the tracings may be of the small unit size, in which case certain standard information, such as name of firm, may be printed on the tracing cloth. Sometimes it will be necessary to issue these drawings as multiple units, of two or more together, to display the bigger pieces.

A point might be made here that where a full size drawing would prove clumsily large for shop use, whatever might be the case in the drawing office, the drawing office should none the less draw out all the main outlines and dimensions to full size—using for the purpose a black board with inch lines scored like squared paper—and making the final drawing to a suitable scale. This allows the proper exercise of judgment as to proportions that a drawing to reduced scale does not.

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The drawing reference for general arrangements both of assembly unit and the complete saleable product may be either arbitrarily fixed with perhaps a qualifying letter or, following on scheme (4), by marking the assembly unit drawings with the assembly unit reference, including the symbol letters, *e.g.* AU301, and numbering the complete arrangement drawings as GA1 and up. The consecutive number in the case of general arrangements may conveniently be that of the design index number—meaning thereby the reference number to any particular saleable product. This point is further developed in connection with component schedules.

No confusion is likely to arise from the following coincidences arising out of the above proposals :

Component Drawing No., *same as* Component Ref. or Part No.

Assembly Arrangement No., *same as* Assembly Unit Ref.

General Arrangement No., *same as* Design Index No.

In view of component references consisting, for convenience, wholly or partially of a number, the term *part number* is a shorter alternative for every day use and this in turn can be symbolised into two letters PN. These letters may therefore precede the component reference in any of the systems described other than (5). Abbreviations in a works, as in the Army, are likely to be very serviceable if well chosen and restricted to the really frequent subject of conversation and instruction, such as PN (part number) and AU (assembly unit) certainly are under the conditions described.

Suggestion as to drawing references for product made specially to customers' requirements cannot be very detailed without a knowledge of the range of products to be considered. A further point is the number of sets to be made to any special design. Little more therefore can be done than to leave to individual consideration the application to special product of the foregoing principles as discussed for standard product.

The system adopted of identifying the component parts of the product has a very considerable influence on administrative clerical work, and, therefore, in a works handling both special and standard products, there is a great deal to be said for uniformity in this direction.

In the case of experimental and provisional designs, the drawing references can conveniently be EPr, etc. The component references can moreover only be tentative in view of the great liability to alterations before the design is finally settled, and if consecutive numbers under scheme (1) prefixed with, say, the letter E are used the experimental character will be evident all the time on

patterns and castings. When the design is fixed and manufacturing contemplated, new drawings and new component references are desirable to obviate confusion with the experimental stage. Drawing and Product References.

Before leaving the subject of drawing references, a point may be made as to what is sometimes called "cost-marking." This usually means giving some cost symbol reference to each assembly drawing, so as to regulate the collection of sectional costs according to a pre-determined plan. The scheme is a makeshift for lack of a system of assembly unit references, though it has a considerable virtue where assembly units cannot be feasibly arranged, as will often happen in the case of special or non-standard products.

In the manufacture of any machine it is necessary to provide what amounts to a working specification, to control and assist production. Component Schedules.

This specification may resolve itself into a drawing and not infrequently stops short there. Under most conditions, however, it will be necessary that in addition there should be a schedule of components, apart from the drawing, though quite possibly the schedules or lists may be attached to the arrangement drawings as well.

With the use of lists separate from the drawing, there is a distinct advantage in restricting the functions of the drawing to that of furnishing dimensions, on the lines already discussed, though material may advisedly be indicated on both drawing and list.

The primary functions that must be served by the separate lists will be to state the range and quantity of components required and the respective materials to be used. Such a list comprises something more than could be stated very well on the drawings themselves, as it constitutes a summary of all the components required for a given order.

Such a list may be termed a part list, but if this part list is so built up that there are distinct lists or sections of a list for each assembly unit, it will be more convenient to designate these sectional lists as assembly lists.

The aggregation of assembly lists to meet a given order may be advantageously identified by a design index number. Under each index number it will be necessary to give a list of the particular assembly units involved, with their drawing references if not synonymous, and the drawing references of any general arrangements. F 48.

Touching the case of complete products that are varied in some relatively minor details, such as style of finish and accessories, to meet specific sales orders, there will not be any need usually to F 47.

**Component
Schedules**

consider each such variation as one of design calling for a fresh design index number. It will be sufficient and more convenient to
 F 50. issue erecting cards specifying the assembly units (for it is to be assumed that these conditions imply that degree of analysis) and also stating the finish required, accessories to be fitted and so on. Separate cards would be necessary for each item of complete product, and these might be hung in metal cases near the work in process of erection. The progressive number of each item would be filled in on the cards ultimately, and by having the card used as the basis of final inspection, all essential records of product supplied can be ensured for all time, without recourse to other documents or to memory.

Where assembly lists are at all standardised, standard lists can be issued for special orders with a "variation" sheet attached amending the list. This practice has, of course, its dangers, as may be said of most short cuts.

A simple method of using the same basis lists, presumably photo
 F 53. prints, for different orders, with probably differing quantities, is to add written slips to the prints alongside the component descriptions, quoting the necessary particulars of order number and quantities required. This obviates the use of "variation" sheets and, though entailing a little more work, is much safer.

In this matter of quantities required, the assembly lists may possibly state only the "number off" per set—leaving the arithmetic as to total quantities to be filled in by the works through the medium of, say, the works office. In this case no extra slips need adding for each order, and any modification of the basis lists can be embodied in a "variation" sheet.

Where spare parts have to be supplied with the working parts, the make up of the total quantities requires more knowledge of the sales specification, and it may be safer for the drawing office to state the specific total quantities required.

The idea of computing in advance the quantities required has been applied to effectively economise in regard to material used on works additions and repairs. The scope for economy in connection with production orders may not be so obvious, but undoubtedly it does exist, and in view of the large turnover of material, a small percentage of saving must amply repay for the initial trouble of stating what ought to be required and to see that no more is issued, except to replace defective work under proper authority.

Practice differs in regard to the inclusion of what have been called standard fittings in the assembly lists. It may seem an ultra-refinement to specify every nut, washer and cotter pin, but it must be borne in mind that the right quantities have to be learnt at

some stage of production for issuing the details to the fitters and erectors. Alternatively, of course, the foreman may draw out these fittings in any quantity he thinks fit, and there is, then no sort of check possible to prevent serious wastage. Economy of material may, of course, be obtained sometimes at the expense of output, and some little discretion will be necessary in allowing the replacement of lost items without undue formalities or formalities inappropriate to the value at stake such as holding up erection for the sake of a cotter pin. Only the correct quantities, as given on the assembly list, ought to be drawn in the first instance for assembling purposes.

A further important function of an assembly list is, in addition to stating the total number of components required, to state the bulk of material necessary to make that number.

F 53.

The responsibility for determining what this bulk should be is part of the functions pertaining to production regulation and is outside the scope of the drawing office. Even in so straight-forward a matter as castings, it is a production question to settle the margin to be provided for replacement of castings defective or spoiled. In other directions the issue is much more involved.

What amounts to a form of assembly list is occasioned in some businesses in connection with sales sundries orders. These may be designated sales sundries order specifications, and can be made to greatly facilitate the putting of such orders in hand. The necessity for specification arises particularly when designs have changed and exceptional care is requisite to ensure the correct interpretation of the customer's order. For this reason, the preparation of these specifications can hardly be done outside the drawing office.

F 51.

A point of considerable importance in obviating these troubles of interpretation of customers' requirements is to make the design reference and progressive number very plain on the name-plate affixed to the original complete product, and to add a request in bold letters, "Always quote makers' No. in full in all communications." The position of the name-plate should obviously be prominent.

In dealing with the form of drawings, the question of sizes of sheets used is apt to loom rather larger than it should on the score of filing facilities. The double elephant size (40" by 27") is the more commonly adopted standard of drawing paper. When original drawings are kept, the filing cabinets are made to correspond, and the tracings made from the drawings should comply with the same standard. There is, however, no reason that every original drawing

Form of Drawings.

Form of Drawings.

should fill the sheet, or that one tracing sheet should not comprise several drawings. Standard subdivisions of the full sheet are, therefore, usually settled to ensure reasonable regularity in the size of the prints made from the tracings.

Rigid adherence to standard sizes of drawings is more reasonable when a blackboard is used for settling dimensions in full size, and when, in the case of assembly or arrangement drawings, dimensions can be largely omitted by giving the component and standard fitting references.

p. 91.
p. 141.

It is an all round advantage for the working drawings of components to be issued in unit form, that is one component only on each print. There should be a standard basis of size and only multiples of this size used. The normal standard can be, say, 10" by 12" or foolscap 8" by 13" according to the character of the work. The tracings may be unit size with possibly the firms name printed thereon. If for filing reasons the double elephant drawing sheet is retained it can of course be sub-divided to suit the standard unit print decided on. The facilities afforded by the unit system of component drawings may be set out as follows:

- For displaying dimensions fully without risk of confusion with other components.
- For indicating dimension limits, also without risk of confusion.
- For simplifying consideration of the best methods of manufacture.
- F 58. For carrying supplementary information as to sequence of operations and list of special tools, jigs and gauges provided.
- For better drawing service in the shops by obviating necessity for borrowing.
- For simplifying instructions by the foreman to the worker.

Original drawings may with great advantage have only a temporary existence and be destroyed as soon as a tracing on cloth has been prepared and checked. There is a process of direct photography which saves tracing, but means the original drawing must be completed in every detail. In the large shipbuilding works the practice is fairly general for the draughtsman to make pencil drawings on thin inexpensive paper indicating all the requisite dimensions, title, etc., in a relatively rough way, and then for this drawing to be handed over to tracers to complete in proper style on tracing cloth. These tracers are, commonly, specially trained young women, the results being satisfactory and economical where there is the volume of work to

warrant a separate department and a proper apprenticeship course ^{Form of Drawings.} for the tracers. The tracings are returned to a leading draughtsman, known as a checker, to be checked, and he destroys the original drawing when the tracing is approved as correct. The tracings can be folded and placed in suitable envelopes for filing in a fireproof room.

All tracings should be jealously guarded, and prints only, used in the drawing office for reference purposes. A very excellent method is for these prints to be bound up in book form for each variety of product. Plan books of this character are sometimes issued to the principal foremen, and will be found a great boon for shop reference purposes. The very bulk of the books tends to ensure their safe keeping. Uniformity in the size of prints may be more important for the purposes of these books than in any other connection.

In issuing prints to the shops some style of mount is necessary. ^{Shop Prints.} The following are amongst the styles in use :

- O: stiff mounts of millboard waterproof board (with or without tin binding) sheet iron, or three-ply wood.
- On brown paper mounts folded to a convenient standard size
- On roll mounts, each stick for rolling purposes being made up of a pair of wooden strips of semi-circular section, attached to each end of the print by screwing together.
- Large prints on canvas back paper mounted on a light wooden frame.

Each method has its uses. Stiff mounts are the best for the smaller drawings for use at machines where suitable rests may be provided. Brown paper mounts are not unhandy for assembly drawings, if proper care is taken, though the risk of drawings being stolen is perhaps increased, and, lastly, roll mounts in conjunction with linen backed printing paper are particularly convenient for the larger general arrangement drawings.

The issue of prints from the drawing office must be most carefully ^{F 45.} registered if only to ensure, when alterations are necessary, that every print is called in. Print index cards under each drawing ^{F 44.} number will be necessary, and the same cards can record prints sent away.

The custody of prints in the works must be carefully looked after, ^{F 90.} and all drawings, as they are naturally called in the shops, though in reality prints, ought to be collected at the end of each week without exception. Where the range of shop drawings is extensive, yet without an excessive number being in use at one time, a simple and effective plan for tracing the whereabouts of the drawings is to have a large blackboard in the shop drawing stores, and to have a series of cup hooks arranged on same to receive a tool check for each drawing issued, the drawing reference to be written in chalk above the hook. Red chalk can be used to distinguish

**Shop
Prints.**

assembly drawings. Otherwise drawings can be loaned under the same conditions as tools.

p 143. F 46. In recalling prints from the works a print recall ticket may be used with advantage to serve as authority and receipt. A carbon duplicate can be clipped to the print index card as a reminder of prints taken out of use. It is, of course, altogether detrimental to production for prints to be recalled until the job is finished. In the case of the pattern shop it may even be better to rule that no print once issued may be recalled. Once a drawing has been altered, a tabular statement of the alteration should be added to the drawing.

It is very convenient for each variety of complete product to be given a reference number which may be called the design index number. The list of drawings pertaining to each such design can
F 47. be set out as a summary for issue with the assembly lists applicable to a given production order.

In the matter of drawings sent in by customers, it may be remarked here, in passing, that these should never be issued into the works but always traced or possibly re-drawn to conform with local standard practice. The extra work is independently enforced, if proper regard is paid to the safe custody of the customer's drawing for reference purposes.

II c

FOUNDRY PATTERNS

As an administrative problem the question of foundry patterns **Pattern Storage.** is almost wholly that of the organisation of the pattern stores.

The pattern shop foreman frequently divides the responsibilities pertaining to the pattern stores with the attendant, but this still leaves the matter one of pattern stores organisation.

A good many pattern stores are run on the basis of memory, and the possibilities of a good memory in this connection are really wonderful, making the establishment of an equivalent organisation appear cumbersome and expensive. There are considerable risks attaching to a pure memory system very much as there are risks in not insuring against fire. In the latter case, it is generally held that the risk is too serious to be carried without the precaution of insurance, and the expense of an annual premium is therefore admitted without demur. In the case of patterns, if the attendant with the memory is missing, the whole system is missing, and the consequences to production of even one day's absence of this man can easily be very serious. The multitude and infinite variety of patterns possessed by most works makes the organisation of the pattern stores a difficult matter, more particularly when the space available is comparatively very restricted, as it usually is. If the lines of product are stable and the designs are distinctive right through, it will be possible—given the requisite space—to keep the patterns for each design separately grouped so as to enable any pattern to be readily found when wanted without any formal register of pattern location.

There is the other side of the problem which no conditions will simplify out of existence, namely, the necessity to know the whereabouts of a pattern that is not in its place in the pattern stores.

The principle of having a specific place for each pattern is admitted generally, but unless the conditions allow of a very orderly and undisturbed lay-out of patterns as stored, it is likely to be difficult

**Pattern
Storage.**

for any attendant to be sure of never varying the place in which a given pattern is stored.

There is, of course, no difficulty in adopting a suitable scheme of location reference, such as will result from the various stacks and tiers of shelving being lettered A, B, C, etc., referring to the floor under the shelving, the lowest shelf, the second shelf, and so on. Each bay or block can be numbered as erected, and a reference such as 1B will then mean, lowest shelf of block 1.

With location references available, there should be some central record card on which the attendant can register the location decided on for each pattern, and where he, or anyone else, can afterwards refer for learning the appointed location.¹ Such records should include the drawing reference and a record of the core boxes, and extra pieces pertaining to each pattern, also as to any strickle boards, or setting out boards. It will also be of service to record whether the pattern is in metal or wood, and also if the pattern is a multiple pattern, that is, if from one moulding more than one casting, from the component point of view, will result. Bush patterns for instance, may be made in lengths suitable for making several bushes from one piece as cast.

If patterns are altered in any way, then the nature and purpose of any such alterations should also be noted on the central record card above mentioned. This tabulation of alterations is just where sins of omission are most likely to occur. The importance of such tabulations depends entirely on the use to which the complete records are put, but in almost all cases there will be some liability for information, as to the existing application of any pattern, to be required at short notice, usually with a view to some repeat order for castings being filled.

In some businesses the variation of product is so interminable that a good many patterns may be of the roughest description, possibly not warranting even a pattern mark, still less any record of alterations. Under such circumstances the patterns are at best only temporary ones, and the memories of the pattern stores attendant and the pattern shop foreman must jointly be sufficient for all purposes during the life of such patterns.

**Pattern
Records.**

Records are also necessary to show the whereabouts of a pattern when sent away from the pattern stores, and it is an obvious economy to make the central records above mentioned serve this further very important purpose.

The importance of this information is greatest when patterns are sent to outside foundries, and particularly so when the orders for

¹ A scheme for rapid reference is embodied in form F 68.

castings are distributed between several outside foundries or between **Pattern Records.** outside foundries and the works foundry.

In view of these functions of the central records it is convenient to designate the cards as pattern tracing cards.

These pattern tracing cards by a system of cut corners (refer specimen form F 67) can be made to show graphically which patterns are away, and where they are. The fact of the patterns being away can be made plain by standing the card on end in its proper sequence of pattern mark, or part number, and applying a coloured metal signal to show what foundry; cards without signals but turned on one end indicating, say, the works foundry.

To maintain this tracing scheme, it is necessary for the pattern store attendant to enter up the patterns sent out, and the patterns returned. The entries of patterns sent to foundry can be associated with the instruction to the foundry to make castings. The casting instruction sheet can be arranged for carbon duplicate to meet F 69, these requirements.

As to patterns returned to the pattern stores, the foundry foreman might conceivably make out a note in duplicate, showing the patterns returned. Alternatively the pattern stores attendant could make out a goods acknowledgment form, or its equivalent, F 83, for the patterns received back.

Under most conditions it will be the better practice for patterns to be returned from the foundry, on completion of the casting order, rather than to allow patterns to remain at the foundry, to be possibly mislaid or ill-used. Conceivably with certain patterns from which castings are being ordered at frequent intervals, the return of the patterns after each order might be inadvisable. The same may be said of all metal patterns, and patterns mounted on plates, for use in moulding machines, as the form of the pattern is presumptive evidence of frequent use.

It may be taken as essential to efficient foundry service, that all patterns that are finished with for the moment, shall be put in a proper place out of harm's way, and that patterns waiting to be put into use should be located at one suitably equipped place, within or close to the foundry—thus leaving about the foundry only those patterns which are actually being used. Under these conditions, the discretion as to return of patterns on completion of order can be more readily exercised, while the finding of any pattern not yet returned from the foundry will be facilitated.

When patterns are specially recalled from the foundry during the progress of an order, it is certainly desirable to make the recall in a regular manner in writing under proper authority. Such

**Pattern
Records.**

recalls should be notified by means, say, of carbon copies of a pattern recall slip, to the works office and to the foundry. These written communications as to change in plans are vital to efficient co-ordination.

F 70.

**Orders for
Castings.**

Writing with chalk on the pattern is frequently made to serve as a casting order. A better alternative altogether is to fill in small adhesive labels, with the necessary instructions in ink, and stick the labels on the respective patterns. This does not inform the foundry foreman adequately of work coming in, because he may not personally see the pattern at the time—though depositing all patterns at one spot will greatly help matters. Then again the delivery requirements must be continually under the foreman's notice apart from the pattern. To this end it will be better to have

F 69. the casting instruction, in a form suitable for conveying all the necessary information as to quantities, metal and delivery requirements. The pattern shop may be supposed to derive the necessary

F 53. information from quantity slips supplied by the works office.

It is appropriate to this discussion on patterns, to mention the necessity for the general stores to index the casting instructions they receive, so that if a pattern mark or part number crops up through recall of pattern or other cause, they may know on what order the castings are being made.

F 68. This index may be readily prepared on squared cross index sheets, numbered 0-9 across and 00-90 down the sheet, making one hundred squares on each sheet. This cross index sheet is very useful, whenever castings are delivered under incorrect instruction numbers and for reference to earlier applications of any pattern.

**Pattern
Marks.**

p. 94.

A pattern mark register is necessary to supply numbers for use as pattern marks, that is to say, when a new pattern is made for which a pattern mark is required, an entry will be made in this pattern mark register against the next consecutive number.

In the matter of pattern marks, where there is no component reference or part number given on the drawing, then the pattern shop foreman from his pattern mark register will take up a number reference, which he will need to mark on his drawing, if all possible confusion on the score of reference by names is to be avoided. This means that the prints issued to the pattern shop will either have to be retained there, or the information as to pattern marks adopted conveyed to the drawing office for inclusion on the tracing. It is, of course, all to the good that the drawing office should know these pattern marks, though it is probably sounder practice for them to always use drawing numbers for cross reference, when any design is

founded on a previous one and allows the original pattern to be utilised. A reference in the later drawing, to the effect that an existing pattern, as made to a certain drawing, is to be used with modifications A, B, C, etc., will achieve as much as quoting the pattern mark. The plain indication as to any differing dimensions will save much time in the pattern shop and obviate mistakes; and should be the unfailing rule in the drawing office.

Coming to the consideration of part numbers in relation to patterns, it is obviously a boon to have part numbers appearing on the respective castings in raised figures. This means applying raised figures to the pattern, and a very convenient and cheap means is to use aluminium strips embossed with the requisite figures, by means of a name-plate embossing machine, such as have been placed on the market as slot machines, which can be installed in the pattern shop.

Obviously if a given pattern is to make a certain numbered part, and that only, then there is no reason to have any pattern mark other than the part number. A part number pattern mark register F 66, will still, however, be necessary if only as a record of the pattern having been made. The illustration given in Section VIIc embodies further uses of this register.

It may be remarked that, ordinarily, pattern marks are not made so as to be reproduced on the casting, being merely stamped in the wood of the pattern. The difficulty that arises over the use of part numbers, in lieu of pattern marks, is occasioned by the use of one pattern to produce castings for different applications. A common case is that of right hand and left hand applications of the same castings, the machining being, however, different and necessitating distinct part number references for the finished components, or it may be that a loose piece has alternative positions on the pattern F 48, according to the part required. Other cases occur when an alteration of dimensions in the finished component does not affect the pattern but changes the part number. The difficulty is not satisfactorily avoided by adopting an arbitrary pattern mark, having no reference to any application of the casting to make parts bearing different numbers. Such a pattern mark has the negative virtue of not misleading, but does not help to identify the casting, or rather the possible use of the castings.

A convenient method of overcoming the main difficulties will be, firstly, to retain the part number in lieu of a pattern mark, so as not to break away from the general scheme, and secondly, when any pattern becomes applicable to more than one part number, to prefix the original part number, as fixed on the pattern, with a symbol X. This would mean that if X321/1 appeared on a casting

**Pattern
Marks.**

p. 96.

every one would know that such casting would make parts numbered 321/1, and also some other parts bearing different numbers. It might be expedient to have the part numbers for the alternative applications added to the pattern, using the original one for reference purposes. It is certainly important that castings having alternative applications should bear some clear evidence of the fact in all stages of production. Suggestion has already been made that when a component has more than two applications or uses it may be convenient to establish it as a standard fitting with a corresponding SF reference. This principle of standardisation could be applied to castings having several applications so as to obviate the need for multiple marks on the pattern.

When, however, for purposes of economy an existing pattern for producing one component is temporarily altered so as to serve for a different component, and while in its altered form, will not serve its original purpose, then the original part number requires to be blocked out by covering the number plate with a blank cap of suitable shape, and temporarily adding the appropriate part number for the modified pattern.

In considering foundry process accounts, suggestion is made on page 512 that a grade mark should be added to each pattern to indicate the class of casting from the point of view of the rate to be charged for same.

II D

PRODUCTION ESTIMATING AND RATEFIXING

RATEFIXING is an established term for the process of fixing piece or premium job rates for manufacturing operations or jobs, though it was in connection with the premium system that the practice of employing ratefixers first applied. Piece rates are more commonly called piece prices or piecework prices and premium rates more commonly called time limits, but job rate is better as applying to either system. In certain districts the expression basis time is used for the standard time limit, possibly with the idea that allowances for special difficulties would be additional to the so-called basis time and that the grand total would be the effective time limit. Be that as it may, the essential basis time is the estimate of reasonably efficient performance by a worker of average ability, to which is added a certain margin to allow of extra pay being earned according to the degree to which the efficient performance or the standard accepted as efficient is approached or improved upon. The estimated time plus the extra pay addendum constitutes the job rate.

Ratefixing infers the fixing of rates for some system of individual payment by results, but this is too narrow a view to take of the application of the principles that ought to control ratefixing and to indicate a wider scope the term *production estimating* has been adopted. Ratefixing can be defined as the application of production estimating to the fixing of job rates. This lifts the matter on to a higher plane as inferring analytical methods of measuring process efficiency and consequently of increasing output on lines quite distinct from the attitude of bargaining between the worker and the management. This view-point opens an enormous vista of possibilities in any works and perhaps most in those where no system of payment by results exists. Such systems commonly operate to defeat real efficiency by perpetuating too low a standard of satisfactory performance—the penalty paid for want of knowledge of proper methods of production estimating.

**General
History and
Principles.**

The recognition of ratefixing, as distinct from foremanship, dates practically from the use of high speed steel and the consequent development of the premium system about 1900. At Elswick, at least, these matters received considerable attention earlier still—the ratefixers being called machine inspectors, and later operation inspectors, with special responsibilities as to feeds and speeds.

p. 159.

Prior to this period, however, the work of fixing piecework prices formed one of the many functions of foremanship and, as such, came into conflict with the other and apparently more important duties of these officials. This work was usually done by assistants—subject to the more or less formal criticism of the senior men—who were chosen as foremen for their ability as mechanics and without reference to their capacity for judging the value of work. While nominally the methods followed in connection with the fixing of prices were those of observation and comparison, the actual practice, owing to the many calls on foremen's time, arising out of their multifarious duties, was more generally to fix a price after the completion of an operation on the first batch of an article, when the time taken, together with the character and ability of the man performing the operation, were considered and a price fixed. The personal element coming so prominently into the question, it will be seen that the results obtained under these methods could have no pretensions to efficiency and it is an unfortunate reflex of the present position that in very many works to-day the methods in use are the same as described above.

Apart from the difficulties surrounding the work of fixing piece prices due to the many duties allocated to foremen, the question of the methods followed—observation and comparison—call for attention. Each method has value but with the exception of very short and purely mechanical operations, where elaborated methods of analytical observation are used, neither can be relied upon to give the best results, and consistency, a decided desideratum, is practically impossible to obtain. Dealing with the class of observation referred to in relation to the individual, there are at least three important psychological factors which must be considered, namely, the worker's skill, energy, and desire to produce. The influence of any one of these factors alone is quite sufficient to make consistency difficult, while the three together serve to make it impossible to obtain.

At the same time, the large amount of non-repetition work done in this country must be borne in mind, together with the difficulty and expense of the satisfactory observation of any but operations of short duration, without which the results obtained will be far

removed from what is reasonably possible and the standard of efficiency accepted will be proportionately low and in effect a standard of inefficiency. It was the recognition of this unsatisfactory state of affairs which caused attention to be given toward finding a sounder and more reliable system and the results of these efforts have found expression in what is to-day generally known as ratefixing. Not all ratefixing is on a mathematical basis, indeed it is often done little better than when the foreman did it and with as little analysis.

The method of fixing rates by comparison alone is hardly worth discussion. It can do nothing further than confirm existing practice, whether that be good or bad, and does not give any idea as to the real efficiency of the shop practice, and can, moreover, only obtain when operations are similar.

In order to make the position quite clear it should be stated that the references to observation apply mainly to that which has been allowed to pass as such in this country. In the United States of America, motion study—really analytical observation—has been somewhat highly developed in certain directions and greatly discussed in consequence of the astounding increases in output achieved in purely manual operations, the aim having been to eliminate wasted effort in movement, as well as wasted time, and to provide against fatigue.

When a large number of pieces have to be made or a large bulk of material handled, the cost of such investigation can be easily justified and, in the case of the use of tools of new type, motion study may even be considered to be essential. As a practice, however, either due to want of tact on the part of the observer or the desire to take too much advantage of the results of the observation made, motion study is not popular in America and to an even less degree in this country. While undoubtedly this is partly due to the pulling up of pure indolence, it needs to be remembered that a man is not an automaton and that an operation which may be purely mechanical and be done in one minute will not necessarily be continued at the rate of 60 per hour. Any kind of observation, whether termed motion study or not, should be continued for a sufficiently long period to take into consideration the sharpening and resetting of tools and other contingencies and the natural and reasonable tiring or fatigue of the operator. It is feared on the one hand that this has not always been done, and, on the other, the observations have been carried out with too little consideration for the person being observed. It may be instanced that as a result of complaints made regarding the state of nervousness often resulting from observation being made, the American Government has forbidden its use in its own workshops.

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Where observation is practised, the work should be done with a view to obtaining the operator's confidence and with the idea that it is the operation itself and not the operator that is being observed. The question is larger and has a deeper significance than is frequently thought and is not generally recommended excepting other methods fail and then only when reasonable care is taken to ensure that the operator is not distressed.

The fundamental difference between observation as described and production estimating is, that with observation, there is no independent criterion or reference basis for work done; in each and every case the results obtained are coloured by the personal limitation of skill and energy of the operator, whose aims all the time are likely to be defensive. Under the observation method, too, faults and weaknesses of machines and tools are not so likely to be thrown into relief owing to there being usually no records made and therefore no standard of comparison.

Production estimating, as understood and described in this work, may be looked upon as an analytical process of splitting each operation into its steps or elements and then computing the time necessary for the performance of each step. The basis of computation is a pre-determined one, built up in engineering work on the known capabilities of the tool steel and machine used and, where hand labour is concerned, on specially demonstrated performances of steps such as tapping holes, chipping faces, scraping surfaces, etc., etc. This data may be based on actual and carefully observed performances of good average workers, or again be the result of the work of the estimator himself carried out for that purpose, or for testing data already in existence.

It may thus be stated that, for the greater proportion of work to be dealt with, the advantages of analytical observation or motion study as practised in America on lengthy repetition work are, in effect, made available by this method of production estimating on work not necessarily highly repetition in character. By the reduction of the results of such analytical observation coupled with estimating to tabulated data, further observation is rendered largely unnecessary and the friction and distress of mind previously referred to, as accompanying motion study, is obviated. Of course, where machine work is concerned, the question of obtaining data is not so much one of rapidity and continuity of personal movement as the capabilities of the tool steel to stand up to the feed and speed it is desired to use and on which future calculations are to be based.

It will be seen that such methods of production estimating convey distinct advantages over observation, inasmuch as the basis used is definite and tangible data; which can be submitted to and be

authorised by the works management. Further, this data provides a ground for discussion in the case of complaint, a most important and useful feature, and goes far towards ensuring consistency of rates, the lack of which will always be the cause of much trouble.

Intelligently administered, it is possible to ignore entirely the personal equation, although it cannot be too strongly emphasised that the reasonable capabilities of an average man should be the foundation of all data.

It must not be construed that the provision of data, however carefully collated it may be, is all that is necessary. Work varies so much in kind, and human skill with it, that the most widely based data requires discretion sometimes in its use. The production estimator should be not only a skilled craftsman able to instruct others, but a man of broad views, good principles and possessing great tact, otherwise the best devised system and most carefully prepared data can fail in their results.

Ratefixing, in the sense used here, is more commonly restricted to machining and fitting operations on saleable products. The principles have had a considerable degree of application in other trades such as electrical, woodworking, forging, sheet metal working, decorating, manual work, etc. It is of passing interest to know that most of the metal and fabric work on Airship R. 34, which made the round trip to the United States in 1919, was done under a system of ratefixing.

In the case of toolmaking and millwrighting, neither the piecework nor premium system is often applied, though this is a field affording much scope for reducing costs. A job rate for each stage of such work is necessary, as the work to be done becomes evident.

Before proceeding to indicate the method of building up an estimate, it will be of value to note the various considerations which require to be made before estimating is satisfactorily possible and afterwards to consider what result the beginning of such consideration is likely to have on the shop and its output.

In the case of any work it is essential to know precisely the extent of the operation to be performed, not least to record same for future reference.

Where machine work is concerned, the capabilities of the tool steel used should be known as the result of actual cutting tests on the different kinds of material used, and should be stated in terms of so many feet per minute, together with the depth of cut and feed obtained. From these tests, the type, shape, and angle of cutting tools should be decided and arrangements be made that all future supplies of cutting tools shall be to the specification thus laid down.

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Preliminaries
to Production
Estimating.

**Preliminaries
to Production
Estimating.**

The size of the rough material must be specified and adhered to, and the quality of the workmanship required, both as to size and appearance, must be known. The power, revolutions, adaptability of the machine must also be considered, and it will be not infrequently found that with this detailed knowledge of the capabilities of the various machines and types of machines, the preparation of the estimate, as to the time the operation should take, will call attention to the fact that some other type of machine could be more profitably used.

Far-reaching influences can result from having all records of speeds, feeds, and depth of cut which each machine will stand, tabulated and carried in blue print or other form near or on the machine for the reference of workman, foreman, production estimator, manager, F 64 and any others interested. Each plant record card should carry a copy of any such table.

Other items which must not be overlooked are the number of articles to be done, a matter dealt with further on, the tool and drawing service, the efficiency or absence of a lubrication, or, as it is sometimes called a cooling system, and the conditions of shop-lighting, heating and comfort generally at the individual works.

In the case of fitting operations, the question primarily hinges on the extent to which the assembly or erection requirements have been made known to the machine shop, and if made known, to what extent they have been satisfactorily met. Possibly there is no more successful method of wasting time and money than by "fitting." It is obvious that careless machining; the leaving on of a few thousandths too much material; machining relative faces slightly out of square; working independently of or without dimension limits, necessitating the scraping out of holes or filing of shafts; etc., etc., go to increase the amount of apparently necessary fitters' work. The right thing to do, of course, is to fix a rate for that amount of work which is legitimate and allow extra time, independently of the rate, for the extra work—but this can only be done when a standard for machining is laid down.

The natural result of the investigation necessary to allow of the reliable information required being made available, is the discovery that inefficiencies exist. In very many cases enquiries F 65. of the kind, referred to as necessary before a production estimate can be made, show up, as a result, inefficiency of the grossest kind. The tool service is bad or the tool store is badly organised; belts will not drive satisfactorily; machines are out of repair and turn out indifferent work; the machining is of a low standard of quality entailing extra fitters' labour; or, not infrequently, there is not enough work to keep the shop running.

This all goes to point out the necessity for these enquiries to precede the introduction of any system of payment by result. If this were done, and the abuse and slackness so common to workshops were pulled up as the first business, much of the suspicion which underlies the workers' attitude would be avoided, because a system of payment by results introduced after the abolition of abuses, instead of before, would provide an easier and a fairer start and on a basis which could always be maintained.

In the desire for "improvement," the common practice has been to start a system of payment by results as the first step, and to find with the greater interest taken in the improvement of tool and other services, the tuning up of machines and a regular and sufficient supply of work, etc., that the output has undergone a big increase, individual earnings have become high—really too high for the work actually done—and remedy has been attempted by the suicidal policy of cutting rates. Unfortunately, too, when this is found, the tendency is to blame the workman for having lingered in the past. There may be some truth in such an accusation, but the policy, or, at any rate, the direct results of the bad organisation of many firms is—blindly perhaps—to encourage malingering. It may be stated as a general truth that in normal times low output in any works, from whatever reason, reflects in the first place more or less the policy and state of inefficiency of the management rather than an irremediable spirit of 'ca' canny amongst the workers.

The step toward re-organising or rejuvenating a works is first to find out the weaknesses, whether of organisation, supervision, or administration, and having discovered and corrected these, the question of the introduction of a system of payment by results can be taken up in its proper place and with the possibility of obtaining the best results, knowing that with ratefixing controlled by proper methods of production estimating, as suggested, efficiently carried out, large earnings by individual workers will be representative of skill and energy and therefore desirable.

The question as to what system of payment by results shall be used is a delicate one, owing to the attitude adopted by the trade societies. There can be little doubt in the first place that a definite measure of output is necessary with the time work system as much as for the purpose of applying any system of payment by result. The object of all works is to obtain production, and this can be influenced apart from the general question of works organisation and administration, by the exercise of supervision alone, or, supervision aided by the possibilities of extra pay. It would appear equally necessary and advantageous to know, independently of any

Preliminaries
to Production
Estimating.

**Preliminaries
to Production
Estimating.**

other considerations, what relation the works or shop output has to that which can be considered satisfactory.

At first sight, the employment of highly paid staff to estimate the value of work to be done without translating the result of their labours into job rates, would appear to be extravagant, but this form of supervision will be found to amply repay itself by its influence on the methods of manufacture and the rate of output generally.

The application of production estimating, however, to the fixing of rates for the piecework or premium system, which are the main systems of individual payment by results used in this country, is of considerable importance. At one time ratefixing was more exclusively used in connection with the premium system, but it is equally, and, in fact, really more necessary with the piecework system than with the premium system, owing to the fact that the premium system carries with it a corrective factor which is entirely absent with the piecework system.

**Building up a
Job Estimate.**

The conditions under which the work is to be done being duly weighed up, the question of estimating the actual time required to do any job can be considered. Whether the system of remuneration used be one of time-work, or one or other of the systems of payment by results, it is necessary to consider not only the actual work in the operation to be done, but at the same time, the quantity to be worked on,

the effect which that quantity will have on the methods to be employed, and

the time which will reasonably be required to cover necessary preparations to start the work.

The practices followed vary very considerably, and in some cases the preparation time is provided for in the job rate. It is not logical to do this because varying quantities alter the actual allowance needed. Some managements refuse to recognise the allowance officially, but in practice allow one half or even as much as the whole job rate for one piece as an extra allowance when small batches have to be done. This latter practice has as little to recommend it as the former, owing to the fact that preparation arrangements have no uniform relation to the time necessary for performing the operation itself, and any preparation allowance computed on such a basis is obviously quite arbitrary.

The only satisfactory plan from every standpoint is to definitely and openly recognise the fact that preparation is necessary, allow for it as such, not merely each time an operation is started, but

also when interruptions are necessary and authorised before the batch started on is completed. In cases of either initial or interruption preparation allowance, it is possible to total the weekly cost of such, separately, and thus obtain, approximately, the cost per order of such allowances. This would also be useful as tending to show up unsuitable batching.

**Building up a
Job Estimate.**

With the job rate divided under the two heads of *preparation allowance* per order or batch, and *operating allowance* per piece, the worker will be fairly treated if only a small batch is in question, and the employer will be fairly treated if there is a continuous run of work—the preparation allowance only applying when the job is started, and not to successive batches unless there has to be a fresh start for each batch.

The authorised interruption of any operation on any batch will quite reasonably justify granting the preparation allowance when the job is restarted. The weekly time allocation sheet will serve to indicate to the wages office the continuity of batches, coming as they should under separate references.

p. 147.

The estimating of the preparation allowance in practice usually follows the estimating of the operating time, because it is by going through the steps of the job that it is possible to check what preparation arrangements are involved.

In the case of a machine shop, and other shops in a different degree, the factors entering into the make-up of the preparation allowance are briefly as follows :

**Preparation
Allowance.**
F 26.

Taking instruction from chargehand.

(Material is to be understood as already at machine, and further that chargehand has obtained necessary drawings in advance.)

Obtaining tools and gauges.

Preparing machine and setting up tools.

Restoring machine to normal condition and returning drawings and tools—at end of job.

It is possible to simplify and at the same time regulate the fixing of these allowances by having standard times for each step which can be applied as required.

Taking a capstan lathe as one of the more difficult machines. The tools and tool-boxes commonly used are for : (1) plain turning, (2) parting, (3) radiusing, (4) screwing dies and drills—the changing of collets is also involved. The allowance to be made for the setting of each of these tools, according to the accuracy of the work demanded, together with any other items contingent only on the

Preparation Allowance.

start of the operation, may be standardised and readily applied as and when required.

Lathe work, milling-machine work, and all other forms of machine work and fitting work can be similarly treated.

Thus, for the purposes of illustration, the setting up of a capstan or turret lathe for turning a plain cheese-headed $\frac{1}{2}$ in. bolt, with the threaded end radiused, is taken. The following is a representative schedule of the estimated times of the preparation steps which, however, may require adjusting according to local conditions and class of work.

Specimen Preparation Allowance Estimate.

Receiving instructions and obtaining job ticket -	5 minutes.
(Tool boxes are assumed as being at the machine and in position, it being good policy to keep a turret on one class of work.)	
Change collets and adjust to grip bar - - -	4 "
Grind and set turning tool for barrel - - -	8 "
" " head - - -	6 "
(of less importance for size than barrel)	
Grind and set recessing tool for end of thread (if required) - - - - -	3 "
Grind and set radius tool for end of bolt - -	3 "
Change and set dies in box for screwing - -	6 "
Grind and set parting tool - - - - -	3 "
Allow for obtaining dies, collets and gauges, and clean machine down - - - - -	10 "
	<hr/>
	48 minutes.

The total gives the basis estimated preparation time, to which must be added the extra pay addendum according to the system of payment by results used, thus arriving at the preparation allowance entering in to the job rate.

Operating Allowance.

Turning to the question of the operating time, this involves cutting time and handling time. The cutting time lends itself more readily to mathematical calculation, although all formulas used must be founded on actual experience.

In the case of machine work, the cutting time formula is based on the amount of material to be removed, thus involving the speed of the work, the rate of feed of the tool, the length of travel of the tool, and the number of cuts to be taken.

Handling may involve the following steps :

**Operating
Allowance.**

Fixing of the work.

Grinding and setting of tools other than the initial setting.

Starting of cuts, entailing withdrawal of carriage.

Gauging of the work.

Natural and reasonable fatigue of the worker and minor contingencies.

The estimating for these factors has necessarily to be left, within limits, to the personal discrimination of the production estimator, who should follow a consistent practice based on shop conditions.

In the course of manufacture, contingencies will arise for which **Extra Allowances.** *extra allowance* must be made. These may take the form of :

Defective material,

p. 365.

Hard material,

p. 492.

Excessive material—either in the raw state for machining or in the machined state for the fitter,

Tools will not stand,

Tools unsuitable,

Errors in gauges,

Power of machine insufficient,

Authorised interruptions,

etc., etc.

It is quite likely to be found that, where rates were fixed by foremen, difficulties such as these did not make their appearance frequently, if at all ; and this should not be interpreted as a fault arising out of the determination of job rates by an independent production estimator, but rather as reflecting a state of things which had not been brought to light. The more serious aspect is that provision for one or other of these troubles would frequently be covered by the rate as first fixed, so that even when the trouble was quite temporary its cost was made a permanent charge on all future production of the same piece.

It is the crucial test of an efficient system of production estimating that legitimate or normal work only is allowed for in the job rate and that anything outside this needs to be considered specially, and, if necessary, made the subject of an extra allowance. One F 25. good result of this method is that matters, which were previously not brought to light and therefore not known,—and this covers many things, both satisfactory and unsatisfactory—are brought under review and, if acted upon, enable weaknesses to be investigated and the general efficiency of the works to be improved. To this end, it is of advantage that a daily record

Extra Allowances.

of all extra allowances granted be forwarded to the works manager.

Regulations for dealing with defective material are given on page 251, under Works Regulations for Payment by Results.

Tabulation of Production Data.

It may be thought that a very large staff would be required if each operation needed to be estimated in the manner described. This view would be correct more particularly where operations of short duration were concerned or where such predominate. While there is an efficient way out it is worth while remembering, in considering expense, that the danger of wasted time is likely to be greatest where there is a multiplicity of short operations.

Dealing with the question of cost of production estimating, this can be very much minimised and at the same time made more efficient by taking advantage of what may be termed the tabulation of data.

Tabulation, moreover, because of its wide and permanent use, becomes one of the most important branches of production estimating. Properly and carefully done, tabulation can do much toward raising and maintaining the standard of output of a works.

- F 64. As mentioned on page 116, it will be found both of interest and value if note is taken of the cutting speeds and feeds used, together with the usual depths of cut taken, for all the metal removing machines in a works, afterwards trying out the tool steel to ascertain what is possible from the machines. The differences will usually be considerable, not only as between the practice current in the shop and the best possible, but also as between machine and machine of similar type. Of course, only similar machines can be compared for amount of material removed. Any differences
- F 65. so found require to be corrected and rates given, based off the corrected practice. This can be best done—possibly only done with certainty—by the use of tabulated data.

In tabulation only those items of operations can be satisfactorily included which are known always to apply and which have a definite magnitude or bear a certain relation to cutting time. Where these are known, they can be profitably embodied in the table, because by so doing, after considerations and calculations are avoided.

Attempting to cover too much ground by tabulation is dangerous, and may lead to bad results. Usually speaking, the conditions of work, when a general utility machine, such as the shaping machine, is concerned, vary so much that it is not often possible to do more than deal with cutting time and tool upkeep, which latter bears a relationship to cutting times.

Gauging and job-setting on the machine vary considerably and cannot logically be computed as a general percentage on the cutting time. For example, a small rectangular block of material, may require to be shaped, the setting for machining being of the simplest. A forging weighing one hundredweight may also have a face of the same dimensions as the small rectangular block above mentioned, which requires machining. A reasonable cutting time for one cut on such a face might be assumed as three minutes. If setting the job were to be included and be based off the simple setting of a block, three minutes or less might suffice, which would make a total of six minutes. The forging, however, may actually take fifteen minutes to lift on to the machine table and set; a matter of 500 per cent on the cutting time, instead of 100 per cent as in the case of the small block, although the actual machining work would be identical in both cases.

Tabulation
of Production
Data.

Gauging conditions may vary in the same way. Some gaugings consist in working to lines only, others in obtaining thickness, while still further with others it is necessary to consider the relative positions of other faces. Although these latter may not be included in the table, it is possible to lay down guiding lines, and in some cases to make definite alternative allowances. It will depend on the class of work required and the practice of the shop.

The amount of material to be removed, too, also needs to be considered. When using bar material and for plain faces, this can be more or less controlled, but where irregular shapes or forgings and castings are concerned, control is only possible within wide limits. It will, therefore, be found of value to allow time for one cut, this time to be multiplied by the number of cuts required on the basis of the table. If the class of work or dimensions of material were such that more than one cut should not be necessary, instructions could be issued to the ratefixer that any cuts required in excess of one should be referred for consideration and sanction as an extra allowance.

The tables may take one of two forms. Rates may be quoted for faces of given dimensions or they may be quoted for definite sizes. If given in terms of area, area would require to be calculated and read as the length of tool stroke multiplied by the width of the tool traverse. This would be necessary owing to the fact that in order to enable the tool to clear the work, the cutting stroke would usually require to be at least one inch longer than the job. This fact must be allowed for at all times. Thus, with a surface three inches long, the extra length of stroke required to clear the tool is one-third of the whole, whereas when the surface is twelve inches long, the extra travel would be one-twelfth only.

**Tabulation of
Production
Data.**

The work entailed in building up tables is considerable. In some cases the increases are regular while in others the differences may be either progressive or diminishing. It is generally possible, however, by calculating three points on each line and transferring same to a chart or graph to read the intermediate sizes and thus save the greater portion of the calculation otherwise necessary.

**Job Rates on
Mass
Production.**

In mass production, where any operation may be repeated an enormous number of times, the question of fixing job rates is one deserving of special attention. Preparation allowances will not be called for.

Operations may take but a few seconds to perform and the handling time be far in excess of the cutting time. While it is possible to estimate this time within close limits, it is advantageous to have the machine set up as for manufacture and try out the tools in every possible way to ensure that for shape, angle and general design they are all that can be wished.

The difference between the output possible at the start up of a new job and after a month's working is frequently incredible, in fact it was largely due to ignorance of this that munition earnings were so great during the war.

It is often found for a new operation that a rate which later on proves to be liberal, appears at first to be so impossible to the worker that no attempt is made to make the job "pay."

A method, which gives satisfactory results and is a recognition of the difficulties a new operation presents to the operator, is to make an extra allowance for a first given quantity, or for a probationary period of time. For example, where the job rate is 1 hour per 100 pieces, the extra allowance may be graduated possibly as follows :

$\frac{1}{2}$ hour per 100 for the	first 5000 or the first week.
20 min. " "	second 5000 or the second week.
10 " " "	third 5000 or the third week.

Normal conditions to be then assumed as obtaining.

In some cases the machine itself is transferred to the Tool Room for this setting up and trying out, but excepting the right class of operating labour is transferred as well, the best results may not be obtained.

**Job Rates
when Work-
ing more than
one Machine.**

Different opinions are held regarding the working by one operator of more than one machine, it being considered by one school that output suffers and neutralises any saving in wages otherwise made,

and by the other, that the saving in wages counter-balances any slight loss in output through the occasional standing idle of one machine while another was being attended to. Both points of view are entitled to respect. **Job Rates when Working more than one Machine.**

To work more than one machine on operations so short that machines are generally standing idle is bad economy, but this tends to condemn the judgment of the particular management rather than the principle or the practice.

The decision as to the number of machines to be worked is essentially one for the production estimator to investigate in the light of his estimated times.

Where fully automatic machines are concerned, the matter is fairly simple, the number of machines to be worked being decided by the amount of time required for feeding the rough material and the amount of inspection required to ensure attention to the tools being given as soon as necessary.

The deciding factor for non-automatic machines is the relation of handling times, including setting per piece, to cutting times. Where there is a series of machines performing different operations on identical pieces, the time occupied in cutting on the longest operation must be in excess of the time necessary to change the pieces on all the machines. Otherwise the series of machines cannot be all kept going continuously and, apart from the obvious halts in production, the flow of pieces from one operation to the next will be interfered with and the efficiency of the whole group of machines lowered.

Where a series of machines is working on entirely different pieces, the same considerations apply in equal force with this difference that if any machine is idle momentarily the flow of material to the other machines in the series is not affected.

If the number of machines possible for one worker to look after without loss of output be intelligently decided, the need for extra allowances should not arise; in fact, if the class of product be one which is at all competitive, consideration of such cannot well be admitted.

It is feasible to settle for each operation that one operator may reasonably look after one, two, or four machines. This being laid down, the rate should be fixed accordingly and not departed from. If less than the requisite number of machines be worked, the operator would suffer a corresponding loss of extra pay; if, as in the case of a very-energetic operator, more machines are worked, the opportunity for additional earnings would be there, and if made, should be paid; if output is not proportionately increased, the additional machine should be withdrawn.

**Job Rates
when Work-
ing more than
one Machine.**

If the decision as to the number of machines to be worked be entirely left to the shop foreman, it will be found that his arrangements are largely coloured by the amount of work in hand at the moment, and the amount of time at his disposal to give the necessary consideration. This does not make for production efficiency.

It should not be possible to incur increased cost by departure from the practice laid down as correct by the production estimator after competent investigation, excepting under special circumstances; this departure to be agreed upon between the foreman and the production estimator, and, if necessary, to be brought under review later.

**Fixing Job
Rates in
advance.**

The question of fixing the job rate before the operation is started, raises various points of interest.

F 26.

In abstract theory, at least, a worker ought to know his rate before he starts the job in question, but in practice there is the difficulty first, that if job rates are fixed ahead of the shop requirements, it may be found that, excepting processes are definitely laid down and rigidly followed, the operation is carried out differently from what had been assumed, and, even if not, unless all the machines of a particular type are of equal power and scope, the rate fixed may require revision owing to the machine used differing from that on which the estimated time was based. The latter point can, however, be met by extra allowances.

In a workshop having machines of widely varying capabilities, although of similar type, it is sometimes a real problem to know what is really the best method to follow. For example, planing machines have wide variations in cutting and return speeds, power and in number of tool-boxes supplied. For this class of machine, it is necessary to estimate each job for each machine and make records accordingly. While it is frequently the practice for planing machines to have only one rate of cutting speed, it is not possible to look upon speed as the only variable factor between different machines, in view of the differences in power and in number of tool-boxes fitted. This is perhaps an exceptional case, but goes to illustrate the danger of working independently of the shops, as it would be necessary to do if all rates were to be prepared beforehand in readiness for when the respective jobs are started.

In a workshop where the plant has been well chosen in accordance with modern practice, this difficulty could almost be non-existent, and by applying a system of alternative rates to suit the few definite types of machines, no danger need be anticipated from fixing rates in advance.

In the case of machines supplied with an adequate range of speeds and feeds, the question is of less importance, although it still cannot be ignored. Where light work only is in question, that is, where the cutting to be done is not of such magnitude as to tax the power of that machine on which the work can be best handled, there would be no difficulty in fixing the rates beforehand, but even then it is necessary to ensure that a worker will not be handicapped through having to do a job on a machine which is inconvenient in use.

Fixing Job
Rates in
advance.

In some quarters the question of fixing rates, before the work is started, is looked upon as impossible and is described as entirely wrong in principle, the claim being made that rates can only be accurately fixed in the shop itself as and when required. There is undoubtedly something to be said for this, particularly where the organisation otherwise is weak, or where the product is of an odd job character. In either of these cases, the pre-determination or scheduling of operation sequence would be less likely to be successful, and, without this scheduling be done, rates cannot be fixed beforehand to be of use in the shops. With the work about to be started in the shop all the necessary information can be accurately collected before the rate is fixed, but the rate is not actually fixed or announced until after the job is started. While this need not be considered as a serious fault, unless the rates be fixed within a comparatively short period of time after the jobs have actually been started, it is possible for the work of ratefixing to degenerate until it is little better than if it were entirely based on superficial and uncertain observation by the foreman.

Workers themselves are divided in their opinions as to which procedure gives them the best results. On the one hand, some workmen fear that rates fixed beforehand are likely to lack adequate provision for certain steps of the operation which they think can be shewn up during manufacture only, or known to themselves only as workmen. On the other hand, other workmen fear when rates are fixed in the shop, and after the jobs have been started, that the ratefixer will take advantage of what they have done, of some method they have taken pains to think out, and, if their rates are so based, feel themselves robbed accordingly.

The method sometimes adopted is to fix a tentative limit, subject to confirmation when found satisfactory.

Some managers argue that every job ought to be done as time work at the first time of asking, and that the rate should be settled from that experience, modified as judgment may dictate.

**Fixing Job
Rates in
advance.**

This is the old way of a worker virtually fixing his piece price by doing one of a batch by way of trial, and then bargaining with his foreman.

Owing to long experience with the difficulties of fixing rates, an attitude of disbelief or even contempt is sometimes adopted toward the "new-fangled" method of "doing it on paper," and the much needed support of senior officials for the analytical step-by-step method is not always obtained. That this attitude is not an honest one is not contended, but that it is due to an indefensible prejudice is more or less certain, and goes far to suggest that one of the first steps necessary in the introduction of the method is to educate the senior officials in the principles of analytical production estimating, with the object of ensuring their support. To the same end it is good practice in a large works to make all appointments for foremen from the ranks of the production estimating staff.

**Piecework
and Premium
Systems.**

p. 251.

Under the piecework system the job rate is fixed on the basis that the whole difference or balance between the guaranteed time wages for the time taken and the piece rate or price is paid to the worker as extra pay.

The premium system proceeds on a different formula; the premium rate is expressed in terms of hours and on other grounds is not exactly comparable with the piece rate.

There are two widely used premium systems—the Halsey-Weir and Rowan.

Under the Halsey-Weir premium system, the job rate is built up so that the extra pay may be computed as one half the saving on the job rate or time allowance. In other words, one half of the difference between the time taken and the time allowed is paid to the worker as a premium.

Under the Rowan premium system, the formula for arriving at the extra pay provides the same percentage being paid on the guaranteed times wages for the time taken as is saved of the time allowance. Thus, if a job is done in 60 per cent. of the time allowed, then 40 per cent. has been saved and the extra pay to the worker is calculated as 40 per cent. on the bare time wages for the time taken.

The tables on pp. 129 and 130 will serve to illustrate the operation of the respective systems. It makes clear that the job rates or time allowances under these systems cannot be compared, ranging as they do from 36 to 45 hours for the same job which could be actually done by reasonable skill and attention in 27 hours. It becomes, therefore, rather misleading to talk of time saved, and the only basis of comparison is that which is indicated by the extra pay ratio—the ratio

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ILLUSTRATION WHEN JOB IS DONE WITHIN THE ESTIMATED TIME.			
(See charts p. 133)	PIECEWORK SYSTEM.	PREMIUM SYSTEM.	
		ROWAN.	HALSEY-WEIR.
Estimated time (E)	27 hrs.	27 hrs.	27 hrs.
Extra Pay Addendum (to give earning of time and third when job is performed within the estimated time)	(Add $33\frac{1}{3}\%$) 9 hrs.	(Add 50%) 13.5 hrs.	(Add $66\frac{2}{3}\%$) 18 hrs.
Job Rate - -	(a) 36 hrs. wages.	(b) 40.5 hrs.	(c) 45 hrs.
Time taken - -	(a ¹) 27 hrs.	(b ¹) 27 hrs.	(c ¹) 27 hrs.
Difference between Job Rate and time taken - -	(a ²) 9 hrs.	(b ²) 13.5 hrs.	(c ²) 18 hrs.
Extra Pay - -	(a ³) 9 hrs. wages.	(b ³) 9 hrs. wages (computed as % on b ¹ derived from ratio (b ² : b—i.e. 13.5 : 40.5 = .333 or $33\frac{1}{3}\%$)	(c ³) 9 hrs. wages (one half of c ²).
Extra Pay Ratio -	(a ⁴) $33\frac{1}{3}\%$ (a ³ : a ¹)	(b ⁴) $33\frac{1}{3}\%$ (b ³ : b ¹)	(c ⁴) $33\frac{1}{3}\%$ (c ³ : c ¹)
Wages cost - -	(a ⁵) 27 + 9 hrs. wages = 36 hrs. wages.	(b ⁵) 27 + 9 hrs. wages = 36 hrs. wages.	(c ⁵) 27 + 9 hrs. wages = 36 hrs. wages.

Piecework
and Premium
Systems.
p. 207.
p. 211.

Piecework
and Premium
Systems
compared.

ILLUSTRATION WHEN TIME TAKEN EXCEEDS THE
ESTIMATED TIME.

	PIECEWORK SYSTEM.	PREMIUM SYSTEM.	
		ROWAN.	HALSEY-WEIR.
Job Rate - - (Estimated Time, 27 hours.)	(a) 36 hrs.	(b) 40.5 hrs.	(c) 45 hrs.
Time taken - -	(a ¹) 30 hrs.	(b ¹) 30 hrs.	(c ¹) 30 hrs.
Difference - -	(a ²) 6 hrs.	(b ²) 10.5 hrs.	(c ²) 15 hrs.
Extra Pay - -	(a ³) 6 hrs. wages.	(b ³) 7.8 hrs. wages.	(c ³) 7½ hrs. wages.
Extra Pay Ratio -	(a ⁴) 20%.	(b ⁴) 26%.	(c ⁴) 25%.
Wages Cost - -	(a ⁵) 30 + 6 hrs. wages = 36 hrs. wgs.	(b ⁵) 30 + 7.8 hrs. wages = 37.8 hrs. wgs.	(c ⁵) 30 + 7½ hrs. wages = 37½ hrs. wgs.

ILLUSTRATION WHEN TIME TAKEN IS LESS THAN
ESTIMATED TIME.

Job Rate - - (Estimated Time, 27 hours.)	(a) 36 hrs.	(b) 40.5 hrs.	(c) 45 hrs.
Time Taken - -	(a ¹) 25 hrs.	(b ¹) 25 hrs.	(c ¹) 25 hrs.
Difference - -	(a ²) 11 hrs.	(b ²) 15.5 hrs.	(c ²) 20 hrs.
Extra Pay - -	(a ³) 11 hrs. wages.	(b ³) 9½ hrs. wages.	(c ³) 10 hrs. wages.
Extra Pay Ratio -	(a ⁴) 44%.	(b ⁴) 38½%.	(c ⁴) 40%.
Wages Cost - -	(a ⁵) 25 + 11 hrs. wages = 36 hrs. wgs.	(b ⁵) 25 + 9½ hrs. wages = 34½ hrs. wgs.	(c ⁵) 25 + 10 hrs. wages = 35 hrs. wgs.

of extra pay to guaranteed time wages for time taken. This is, **Piecework and Premium Systems.** however, only consistent for all three systems when the performance coincides with the estimated time.

As the performance becomes better than the estimate, the extra pay ratio falls under both premium systems as compared with the piecework system—in other words, the reward per job to the worker is not as high under the premium system as it is under piecework. On the other hand, if the performance is worse than the estimate, the worker is favoured by the premium system as compared with the piecework system.

The question of adjustment of job rates has been, is, and possibly always will be, a burning one. Under the piecework system, adjustment or, to use plain English, cutting of rates, has always more or less been recognised, although the fact that this has been the case does not affect the unfairness of the practice or the unsoundness of the logic which supports it as commercially necessary.

The practice of cutting job rates was more or less a recognition of the existing incapability to even approximately measure output, and was in a sense essential as a corrective factor if selling prices were to fall with increased output.

In this connection, it may be stated that the various premium systems have as their basis a recognition of the same difficulty, only, with them, the corrective factor is definitely laid down, is known to the worker, and carries with it an undertaking not to cut or reduce the basis on which the calculation was first made, excepting definite alteration to methods of manufacture be introduced.

So far as the reduction of the total manufacturing cost of any article is concerned as the consequence of greater output, this is ensured under any system of payment by the saving in production oncosts per article produced, providing, of course, that the production oncosts do not rise sufficiently to offset the gain in output—a possible result but not a usual one.

When production oncosts are applied on the basis of time taken in production—a matter discussed at length on page 548 *et seq.*—the effect of a reduction in time taken is reflected at once in the amount of production oncosts incurred and chargeable, whereas with the more arbitrary method of applying production oncosts as a percentage on the direct wages paid, the saving is obscured and not evident. This is so because the wages cost under piecework, for instance, do not fall with a reduction in time; under the premium system they do fall to a degree, but not proportionately.

**Piecework
and Premium
Systems.**

Diagrams are given on opposite page that bring out the net effect on wages cost and production oncosts, taken jointly, of improving production. For the purposes of the diagram the production oncost is taken as the same rate per hour as the time wages and this is not an exaggerated supposition for a machine shop.

It will be noted that the corrective factor of the Rowan System acts more much rapidly than does that of the Halsey-Weir, and makes it impossible for a worker to make "double time" or an extra pay ratio of 100 per cent. This is looked upon as a grievance by workers, and a favourite argument against the fairness of the Rowan system is, that the same net amount of extra pay is paid to a man for doing a job in 75 hours, when 100 hours are allowed, as would be paid if the same job were to be done in 25 hours. There is, however, another equally important fact, and that is that the total hourly earnings steadily increase as the time taken is reduced, and assuming a time wage rate of 2s. per hour, the man taking 75 hours would earn 2s. 6d. per hour, while the man doing the job in 25 hours would earn 3s. 6d. per hour.

It is the experience of many firms that this particular system fails to induce output much above that standard which gives 50 per cent. extra pay ratio, that is, when the employer begins to take the larger share of the saving.

The corrective factor of the Halsey-Weir system more nearly approximates to the piecework system in its rewards.

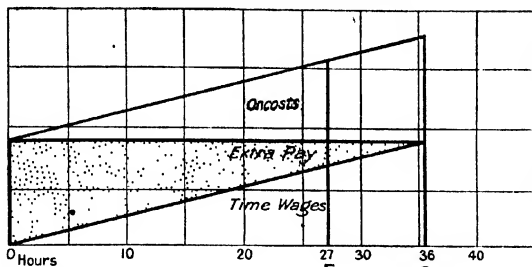
It will thus be seen that the corrective factors of both the Rowan and Halsey-Weir systems are sufficiently protective so far as the firm's costs are concerned to enable rates once set to be commercially maintained, excepting the methods of manufacture are changed sufficiently to justify adjustment. It is feared, however, that all managements are not equally honourable in this matter of rate adjustment. Their keenness to secure the maximum benefit to the employer has made them object to high earnings by the men, and job rates have been cut without adequate justification from the worker's point of view. This course is to the detriment of all employers by destroying all confidence on the part of the workers.

The inclusion of production oncosts on the basis of time worked shows that even under a piecework system total costs fall with an improvement in production, so that with increased output the fixity of the piece rate does not preclude the reduction of selling prices and consequent stimulation of trade.

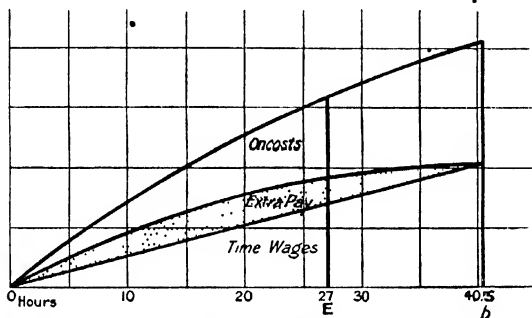
p. 211

Where adjustments are justified by altered methods or modified design, it is only equitable that the new job rate should be so arranged that the same scale of earnings per hour worked will be possible after the adjustment has been made as before, that is,

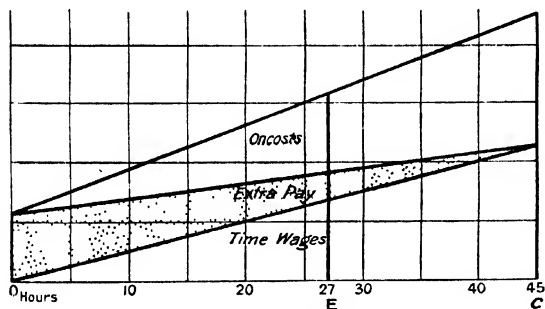
Piecework
and
Premium
Systems.



PIECEWORK SYSTEM



PREMIUM SYSTEM — ROWAN



PREMIUM SYSTEM — HALSEY WEIR

COMPARISON CHARTS OF PIECEWORK AND PREMIUM SYSTEMS.

Job Rates, a , b , c , according to system, derived from a common estimated time E .

(Figures taken from illustration tabulated on page 129.)

**Adjustment
of Rates.**

if an operation on which a man has been able to earn 50 per cent. extra pay, *i.e.* time and half, requires adjusting because of some change in method, the new job rate should be such that the same man could earn the same amount per hour above his time wages.

In 1915 the Ministry of Munitions made an order to the effect that piece and premium rates when established were not to be altered unless the methods of manufacture were changed. This ruling had a wonderful effect in increasing production, but it did not provide for the common case of job rates that had been settled under conditions widely different from those of mass production obtaining with most munition work. The adoption of the principle, as advocated in the original edition of this work before the war, of dividing a job rate into its two elements of preparation allowance at start of job and operating allowance per piece made, would have largely minimised the disturbing effects of differences in quantities to be produced, and yet have given quite handsome rewards to the worker.

**Individual
Super-Bonus.**

As emphasising the desire of the management for workmen to make large earnings, the payment of what may be termed a super-bonus is worthy of consideration. Such a bonus could be paid to that man, who, in his own particular trade or in his shop, has earned, for a given period, the largest percentage of earnings over and above normal time wages. A convenient period is three months and the super-bonus, if not paid in a lump sum, should continue for a corresponding period. The amount offered could hardly be less than £3 if paid in a lump sum, or 5s. per week for 13 weeks if paid weekly. The result of such a scheme is that there is a striving induced, not merely to obtain output, but the greatest possible output, and the cost of the rewards is more than justified. Where the shop is large enough, there may be different classes, each carrying a super-bonus. The more classes, in reason, the greater the interest taken, and, of course, the more opportunities. With the necessity under present legislation of making income tax returns of workers' earnings, the records for that purpose, if kept, as they should be kept, under separate heads of time wages and extra pay, would provide the statistics for applying the super-bonus.

F 19.

The difficulty that has been found to arise under this scheme is that of providing against favouritism by foremen in giving out work—when some jobs are “fat” and some are “lean.” It is not desirable to institute a super-bonus scheme, therefore, unless the fixing of job rates has been carried out on a reasonably consistent basis. In any case the reputation of the management for a straight deal must be so well established that there will be no chance of any

suspicion arising that a bait is being offered to prove that any job rate ought to be cut—further, the question of favouritism by foremen is unlikely to arise in such an atmosphere of mutual respect.

The contention that a collective output bonus, which is usually paid either as a flat rate per person or a percentage rate on wages for so much work done, and affects all workers alike, causes less trouble than the individual systems of piecework or premium can be conceded, as well as the further claim that output can thereby be increased.

Individual
Super-Bonus.

Collective
Output
Bonus.

p. 234.
p. 252.

Generally speaking, output can be increased at all times by the offer of additional remuneration for such, but this is not enough. For example, take a works employing 100 men, who turn out 100 machines or 1000 tons of machinery in one year. A bonus offered for increased output would possibly raise same to 125 or even 150 machines, or 1250 or 1500 tons, but if the amount of work done by the 100 men ought reasonably to have been turned out by 60 men without a bonus, then a bonus is being paid for an increased output which is based entirely on the previous existing, but unrecognised, state of inefficiency and without really being earned.

It may be argued that the fact that the industry was made to pay before the output bonus was put on, and that the increased output under the new conditions would give reduced cost, even if in production oncosts only, would put the industry on a firmer basis. This can be so if the bonus paid is not out of proportion to the increased output obtained, but if a rival firm use a system which is based rightly in the beginning, that firm has at once a real advantage which must always be reckoned with, and which may be sufficiently big to spell disaster to the less fortunate competitor hampered by a bonus system built on a fallacious basis.

There would appear to be no reason why a fair measure of efficiency should not be obtained under a collective system, provided :

That care be taken to ensure that the basis of payment be correct.

That a minimum and consistent rate of output be obtained.

That the number of persons employed is not in excess of requirements.

That their numbers are not added to, or their hours worked increased by overtime, without suitable adjustment of the bonus rate.

That improvement in existing plant or the purchase of new machines is properly provided for.

The question is further discussed under Principles of Remuneration on page 231.

**Appeals and
Investiga-
tions.**

The question of a workman appealing against a job rate is one justifying serious consideration. No arguments are required to support the contention that such appeals should be listened to. If they are not, unrest follows, and workers feel they are denied elementary justice.

The usual and logical practice is for the appeal to be made to the production estimator, who, if he be fitted to fix job rates, and the appeal be based on genuine grounds, should be able either to convince the worker that he is mistaken or be convinced that he himself has made a mistake which requires rectification. Failing this, the shop foreman's opinion may reasonably be sought and in the absence of mutual agreement, a further appeal to the chief production estimator in a large works, or alternately, the works manager, should be definitely recognised as the worker's right. It is in such cases as this that the need for a mind of the right calibre becomes patent in the person of this official. Where he is wisely chosen and a straightforward honest policy be followed, very little trouble should be experienced.

There is a tendency, however, to view this question of appeal in a wrong light, to assume that a grievance can only arise on the part of the worker, and, if none should be voiced, to consider all is well. Elaborate arrangements for appeal committees or the like are sometimes made whereby these voiced grievances can be investigated, and seeing that the activities of such an arrangement are always started by workmen, it is more or less necessary sometimes, whether right or wrong, to make concessions, if only to prove bona fides.

Such an arrangement takes no note of cases where the worker may not have done a fair day's work, and consequently failed to earn the extra pay he is expected to earn. Any job which takes longer than is estimated should, as a matter of efficient administration, be investigated independently of workers' complaints. Records of all performances are necessary to achieve this end satisfactorily. If it be found that the job rate is insufficient, the same should be corrected, or, if special difficulties were encountered which were outside the worker's control, extra allowances should be made. On the other hand, where there were no extenuating circumstances justifying the excess, the worker should be brought to realise that he was at fault and would be expected to improve. While investigation can, advisedly be all embracing, it would not be either politic or fair to take any steps implying a reprimand of the worker on isolated performances. By full investigation, the employer would be able to follow a straightforward policy, which, as it became known by the workers, would be respected as having right aims and be trusted accordingly. "

Collective bargaining, by which rates for the different jobs are fixed in conference between shop representatives or delegates and the management, may be thought to obviate appeals afterwards, but, excepting with highly repetition work, it is hardly practicable in working, being not only costly, but entailing much loss of time and output, as well as causing considerable delay in the administrative routine.

A method sometimes practised for proving the correctness of a disputed job rate is an actual demonstration by the ratefixer, but this method is not fair to the ratefixer or the firm as the former is not likely to have the same familiarity with the machine to be operated as the worker has.

The step-by-step method of estimating time allowances, set out previously, affords a basis for discussion of job rates that will be found altogether superior to any attempt at demonstration. It goes further and makes collective bargaining quite unnecessary as a safeguard against harsh job rates. Indeed the spirit of bargaining ought not to enter into rate-fixing, although this is not yet the case in many firms owing to their inadequate understanding of the principles of production estimating.

The step-by-step method is the only safeguard against inconsistency in job rates. The fact that some jobs are "fat" and some "lean" induces endless heart-burning and disaffection, even if the so-called "lean" job rate can be demonstrated as in itself fair and reasonable.

Appeals and
Investiga-
tions

II E

TOOLS AND GAUGES

PROVISION AND CUSTODY

Definition. THE subject of tools generally in relation to production resolves itself into two divisions, viz., tool provision and tool custody.

By the term tools is meant the loose equipment necessary to the operations of production, including therein the gauges necessary to obtain correct production. They comprise the tools of the hand-worker equally with the machine-worker, and while it might be correct to describe the former as hand tools it would not do to describe the latter as machine tools, but rather as machining tools.

Machine tool signifies the machine itself used for performing formative operations on the work by means of tools; thus, a drilling machine is a machine tool utilising a drill as the operative tool, with probably the aid of accessory tools in the form of jigs or fixings for holding the work. A jig is primarily a device for ensuring the interchangeability of the work done, though it may be termed a jig when its usefulness only extends to facilitating the holding of the work relative to the tool and is really a fixing.

Standardisation of Tools. It will be convenient for the purpose of discussion to consider loose equipment peculiar to the production of particular components as special, and therefore "non-standard," in contradistinction to tools that have a more general application and may, therefore, be called "standard."

It is not altogether necessary that in any given works "standard" tools shall conform to any other than a purely local standard. The distinction might be, perhaps, better conveyed by the terms "special" and "ordinary," though the principle of standardisation ought to be kept always in view, and so far as practicable, trade standards should have preference over purely local works standards.

In some works, for instance, a tap of any pitch or diameter once made is held to be a standard tool, and screw threads of the particular dimensions are supposed to be thereafter standard screw

threads. This is unsound practice as leading to the perpetuation of numerous odd sizes and deliberately handicapping the future necessities of tool provision. Standardisation of tools takes two directions, Standardisation of Tools.

To produce standard dimensions of work.
Merely standard in form.

It is highly important that standardisation of design shall be developed on lines at least favourable to the standardisation of tools. In the case of mass production the consideration may be less important in that the supply of tools may have to be on such a scale as to create in themselves an obvious local standard. In that case, too, less weight needs to be given to the possibilities of buying tools ready-made—a practice that the high quality of tools now on the market very properly encourages, to the mutual advantage of both parties.

p. 88.

The most important stage in the development of the tool organisation of any works is the preparation of a standard tool list, and this must be agreed with the drawing office if it is to be really effective. It must be possible to add to the list as occasion arises.

Assuming such a reference list, tables can be prepared for drawing office use showing the range of dimensions accepted as standard. It is more important to aim at adopting a table of sizes in accordance with existing tools—sizes thus confirmed as having local application—rather than setting out to acquire a tool equipment adequate to cover a range of sizes that may never be brought into use completely.

When the design of a component is in the final "pencil" stage, much advantage to production might result from conference between the chief designer, tool designer and production estimator. Whether in the pencil stage or in the photo print stage, all designs must come under review by some suitable person for the purpose of settling what jigs and special tools must be put in hand. Tool Provision.

p. 9.
p. 23.

At this point the manufacturing policy must bear fruit and guide the amount of expenditure appropriate to each case. There may be little or no option as to much of the expenditure if the component is to be made even approximately interchangeable, while mass production conditions are usually necessary to justify the recognition of every possibility in the way of reducing manufacturing costs.

The exercise of this judgment is largely the expression of efficient works management, but the task is commonly no light one. The works manager may be expected to achieve his end through the medium of the tool designer, though the production estimator, in

a given case, might have the better qualifications for exercising discretion. In some works the responsibility is put wholly, or nearly so, on the departmental foreman. This may be right in certain cases, even to the extent of letting the foremen design the jigs and tools, but generally speaking, the right line to take is to utilise the services of a specialist and rely on obtaining a high average efficiency by virtue of his special knowledge and opportunities. This high average may be a more satisfactory net result than occasional, exceptional performances by foremen, who have so many calls on their time, that prolonged concentration on one aspect of the shop management, as summed up in tool designing, is hardly possible for them, or altogether desirable, if it were possible.

p. 90. Apart from the provision of jigs and cutting tools, consideration should be given to the gauges necessary to ensure adherence to dimensions. Following from this, the adoption of a system of limits on the lines discussed elsewhere has an important bearing on the special provision necessary, and the whole question of standardisation of dimensions will be seen to affect expenditure in various directions.

F 58. Where the tooling equipment is at all important in relation to production efficiency, it may be taken as sound practice to draw up a tools provided list as early as possible after the issue of each drawing to the Works. This list must needs take cognisance of the sequence of operations and therein is apt to lie a stumbling block if the foreman is not the sponsor for this sequence.

It can be argued that improvement in shop practice is prevented by fixing the sequence of operations, but against that must be set the fact that proficiency usually comes from practice, which continual variation of operation sequence puts out of the question. Obviously, considerable knowledge is required, if these operation sequences are to be drawn up to better purpose than the chance decision of the shops.

Although actual tool design is not the province of the production estimator he is certainly likely to be the best man to draw up tools provided lists. To be fitted for his post he must be fully qualified to indicate where standard tools apply and the type of jigs, special tools and gauges required.

The formality of the routine, necessitating as it does a notification of the tools contemplated, to the foreman concerned with the ultimate use of the tools, and an instruction to the tool designer to design the same, can be made a cause of delay and trouble if there is not proper co-operation between all parties.

The difficulty that is apt to arise when decisions have to be written down is the implied necessity for having convictions as to what is right and taking the trouble to put them into words. The natural

tendency to procrastinate may make the routine referred to seem irksome, but there is no gainsaying that the provision of tools should precede the taking up of the job in the shops, and there can be no effective organisation when this matter is left for haphazard treatment. Tool Provision.

The tools provided lists should be typewritten—so as to provide carbon copies for production estimator, tool designer and works accountant. The expense of this clerical work can be recovered by the greater efficiency in production resulting therefrom.

Blank tools provided lists may be attached to the shop drawings, if the drawings are arranged in unit form for each component. As the special tools are made, entry can be made on the tools provided list of the date and tool reference. The entries may be facilitated by having delivery tickets, called possibly completed tool advices, to accompany each new tool sent from the tool room to the tool stores for issue to the shops. p. 102.

Tool room, it may be remarked, is a common designation for the tool making department, which should be quite separate from the tool stores. F 94.

A point may be made as to marking all jigs and special tools with the respective part number and operation for which intended.

A convenient method of putting new jigs and special tools in hand is for the tool drawing, when issued to the works office, to be made the subject of a tool order from that point. It is to be understood that the expression jigs and special tools will cover necessary special fixings and special gauges.

The necessity for having a proper record of all jigs and special tools will be readily appreciated, and this record may be on jig and special tool record cards kept by the tool stores chargehand. The record could even be obtained by merely pasting the completed tool advice, referred to above, to a blank card, sufficiently larger in size to allow of any notes being added, as to alterations or applications to other part numbers.

The procedure necessary for maintaining the stock of standard tools may possibly be centred in the tool stores chargehand with the idea that he shall make out purchase requisitions and tool orders under instructions from the works manager. F 95.

In order to guard against any unauthorised increase of tool stock carried by the departmental store, it should be arranged that renewals should only be made as such in return for an order covering a given quantity, accompanied by the return of legitimate short ends or shank pieces of broken drills or milling cutters, etc. F 54.

Coming to the question of tool custody, the responsibility for keeping all tools in good order can best be vested in the tool stores Tool Custody.

**Tool
Custody.**

chargehand, and he may, with great advantage, have under his immediate charge sufficient grinding equipment to sharpen the bulk of the tools as received back from the shops. He needs, of course, reference gauges and measuring appliances with a view to methodical checking of tool sizes. This checking ought to be done at intervals suited to the class of tool and, in this connection, gauges will be the most important class.

There is much to be said for the practice of using gauges that are adjustable within small limits, and the risk of misuse in the shops, by reason of the workmen altering the gauges, should be met by having separate gauges for inspection purposes. The checking of gauges by the tool stores chargehand must not be a perfunctory matter under any circumstances, and less so when the gauges are susceptible to adjustment. In some instances the use of duplicate gauges to allow of checking on alternate days is found profitable.

So far as the organisation of the tool stores is concerned, much depends on the actual storage of the tools. Particulars of various excellent methods have been widely published, and it would, in any case, be attempting too much here to discuss these details beyond emphasising the imperative need for having a place for every tool, making the absence of any tool obvious. It would often be an advantage to hold the reserve supply of tools, that is, those in excess of current demand, separately from the tool stores.

The system adopted of checking tools in and out on loan to the men is usually that of brass checks bearing the man's shop number. These are sometimes lent, in some uniform quantity, to each workman on starting, and he lodges a check for each tool borrowed; the checks are hung or deposited against the place left vacant by the tool. Sometimes boards with the sizes of tools marked on are provided for this purpose.

This method does not quite meet all requirements, as it is not made clear what tools each man has on loan—a matter of some urgency when he is leaving.

It may be mentioned incidentally that, when men are leaving, or are suspended, the tool stores chargehand should be advised by means of a tool clearance ticket, which the man will require duly certified before he can draw his wages.

F 21.

Trouble often arises with men leaving their tool checks at home or losing them. This difficulty is avoided if the tool checks are kept within the tool store, those not in use being hung on a suitable board under the man's check number. This means that the man must abide by the tool stores records, without being furnished with proof that he either had received or returned the borrowed tool.

The supplementary information as to the tools borrowed by any one man may be furnished by having a substantial label in disc form, with a description of each tool stamped thereon and kept with the tool until borrowed. When borrowed, the label is put on the hook carrying the man's tool checks, and a tool check put in the place of the tool. Tool Custody.

Probably the best compromise is for workmen to give written tool loan slips for any tool required on loan and for the tool stores to hold all the tool checks. When a tool is borrowed the numbered tool check is put in its place and the slip is filed in a card tray or cabinet under the man's number. When the tool is returned the man gets back his tool loan slip and there can be no dispute. The collection of tool slips lying in the tool stores furnishes a most convenient means for rounding up tools not returned at the proper time. If need be the loan can be confirmed from week to week by actual observation, when return to the tool stores might be inconvenient, such as in the case of tools set up in a machine. F 91.

Otherwise, a strict ruling is necessary to ensure all tools being returned to the tool stores each week-end. The tool loan slips for such returns can be held by the man and utilised on the following Monday morning. The practice of one man lending tool stores tools to any other man must be discouraged as breaking down the effectiveness of the tool store control. p. 255

There are a certain number of tools, varying according to the work, that are almost necessarily on permanent loan to the men, such for instance as hammers, and it would be absurd to call these in every week. The course advised is to provide for each man a tool permanent loan card. On this card the foreman will authorise the tools that are required on permanent loan, and when issued these tools will be entered accordingly on the card. This permanent loan account will have to be settled when the man leaves or is transferred to a different department. Round about the annual stocktaking in particular, the tools in the workmen's possession can be agreed with the permanent loan card. F 92.

Files can come in this category of tools as on permanent loan though constantly being replenished. Tool slips can be utilised for replenishments when accompanied by a worn-out file, without necessitating a fresh entry on the permanent loan cards. p. 304.

This latter is only of value, however, where old files are at all times kept out of the workers' reach.

A method of controlling the issue of files and other consumable supplies is mentioned under the heading of materials, where the suggestion is made that the tool stores should be the distributing centre for shop supplies so far as practicable. Padlocks and keys p. 304.

**Tool
Custody.**

for tool drawers and cabinets may be amongst the tools on permanent loan.

In the matter of measuring instruments such as micrometers, a rule may be made as to their return to store each night. Here again the tool loan slip facilitates seeing this routine through by allowing such tickets to be put on a special board to be cleared shortly before closing time.

Obviously, too, a tool store messenger when collecting any tools, by having the tool loan slip in question with him, can exchange the ticket for the tool on the spot—but only if he is qualified to verify that the tool is in good order.

The examination of the tools, as returned, to see whether there has been breakage or misuse is very important. A record of tools broken or lost is necessary, and much good may be done in inculcating habits of carefulness if disciplinary action is taken as called for. Any works rule on this head must be effectively notified to every man concerned. A reasonable application of the rule will be to pick out each fortnight a few of the worst offenders. It is not feasible or politic to carry out any ruling harshly, but when moderately, though strongly, administered, marked economy can result. The records should be made up for several weeks before inflicting any penalties, as the saving that can be demonstrated later will be proof of preventable carelessness in the earlier period. Trades unions are strongly averse to any method approximating to fines, and the case for disciplinary action must be thoroughly established before any step is taken.

F 93.

p 255

[I A—p. 8—Production Programme.]
[I B—p. 23—Production Committee.]
[IV A—p. 275—Material Control]

II F

PRODUCTION REGULATION

It will be obvious that with a limited shop capacity, that is, limited **Necessity for Production Regulation.** in relation to the requirements asked of it, precedence given to one order must be at the expense of another, except so far as the producing equipment allows simultaneous attention to more than one order.

If the need of using discretion as to the precedence allowed to the various orders at the several stages is admitted, then it must be recognised that this discretion is in the nature of regulating the sequence of the work, which may conveniently be described as production regulation. Regulation of this character is commonly done at short notice by the foreman, having regard to the work immediately available for putting in hand and the position generally as to relative urgency of the orders in hand.

p. 161

Usually, too, the quantities in which the foreman thinks are the requirements of the whole order and the regulation or planning goes little further than starting work on the respective lots of components required, leaving to subsequent events the decision as to how far the operation in question shall be carried through for the whole lot. It works out in practice that good intentions are being constantly frustrated, and jobs started in good faith one day are set aside the next in favour of a job found to be more urgent—one probably that was not available for starting the previous day when the opportunity of taking up a new job occurred.

A very little consideration, even by those having only a nodding acquaintance with workshops, will show that the work in progress, that is work available for progress, is in continual movement and cross movement, so that a highly experienced judgment is called into use to exercise anything more than a hand-to-mouth discretion in the starting up of jobs if, out of all this incessant activity, is to emerge the right product at the right time. What usually happens is that the various components necessary to the complete product ultimately emerge one by one and stand by until the last one arrives.

**Necessity for
Production
Regulation.**

A certain amount of assembling may take place pending the arrival of the laggard components but such conditions of working militate very seriously against any proper economy at that stage. The time at which the last component for a given complete product is finished virtually marks the time of useful readiness of all the others.

There will be considerable differences in the time necessary for piloting the respective components through their various stages of production and this means that there ought to be that amount of difference in the time of starting work on the components, if delivery of the whole set or sets is to be synchronised at a given date.

In attempting to regulate the work in the shop, foremen commonly do no more than send the respective jobs, as they become ready for further operation, to the machine or worker whom it is intended should do the job. Then when the occasion arises for a new job, one is selected from the accumulated jobs around the man. This statement is, perhaps, only approximately true as foremen do not usually lose cognisance of urgent jobs that have to be provided for before they actually arrive at the next operation. Speaking generally, there is a great deal of what may be called opportunism in the shops as regards the work, and jobs get started, and may be finished, not so much because they constitute the jobs that ought to be started and finished at that time but rather because they happen to be available.

Any job done in advance of its proper turn means or is likely to mean, the dislocation of output, in that it tends to prevent the completion of output proper to the period concerned.

There is no doubt that regularity of output, that is of product ready for sale, is of prime importance, and is the only sure indication of effective organisation.

For financial reasons alone, it is highly important to make deliveries of some class of output each week and there is a good deal to be said for arriving at some approximate equality in the selling values of each week's or each month's output.

**Sub-division
of Production
Orders.**

The orders requisite to control production may take shape first as sales orders or as stock manufacturing sanctions according to the manufacturing policy adopted. Applications for stock manu-

F 57. facturing sanctions will emanate usually from the works office.

F 49. The authority to produce is embodied in production orders to the works manager.

F 52. It is usually necessary to sub-divide production orders into job

F 104. or sub-orders for the purposes of production regulation with a view to the attainment of regularity of finished output value

on the one hand and delivery to a predetermined schedule on the other.

Sub-division
of Production
Orders.

If the basis of the production programme be regular weekly deliveries, it would be consistent with such a programme to issue separate sub-orders for the batches of parts necessary to each week's intended output. This might, however, give a quite unnecessary number of sub-orders if applied indiscriminately, as perhaps the only department literally regulated by the weekly output schedule would be the assembling department or whatever department makes delivery of the finished product. The smithy and foundry should work to a programme of weekly delivery without, perhaps, necessitating corresponding sub-orders.

There is no doubt that, whatever the process or operation in question, the larger the batch that is dealt with at one time the lower the costs of production can be, provided only that the several operations are carried through without interruptions. What so often happens is that the theoretical economy due to putting through relatively large batches is largely discounted, if not quite negatived, by the almost inevitable necessity to break the batch at some of the operations. Once a batch is broken as to the completion of any operation, then the portion that happens to be ready for the next operation is likely, by pressure of delivery requirements or other cause, to be carried forward to that operation. The net result is, that once a batch is broken at any stage, the chances are all against the batch ever becoming complete for the remaining operations and quite possibly even further splitting up may ensue.

The loss consequent on interrupting an operation must vary with the time required for getting ready to re-start when the job is picked up again. However small the loss may be demonstrated to be, in any given case, it must be a loss and must react unfavourably on the worker's extra pay and on the cost of production. It is further a definite loss of productive capacity, and by reducing output, reduces turnover and therefore reduces the opportunity for profit.

p 119.

In mass production, where there may be said to be a continuous stream of identical articles undergoing the same operation, the liability to interruption is less marked than under ordinary conditions. Where there is a special machine set up for each operation on each piece, as may be said to be the ideal conditions for mass production, interruptions are still liable to arise through the great differences in the time taken by the several operations, and the corresponding difficulty of always balancing the producing equipment to ensure a proper flow of work from operation to operation.

p 6.

**Sub-division
of Production
Orders.**

Under such conditions the chances are that there will be little attempt to batch the components at all but to merely let the work flow as best it may from operation to operation. If the volume of work in progress is only heavy enough, there will be ample work in hand for each operation, so that interruptions due to shortness of work to operate on at any point will be obviated. This solution, if it can be termed that, involves a relatively heavy capital expenditure in work in progress lying virtually idle, and makes it a very lengthy matter to pilot through the shops any line of product that has not been made in sufficient quantities to have accumulated the necessary relays of work waiting at each operation.

This reference to mass production is not an attempt to legislate as to how to apply sub-orders in such cases, because the proper solution must always be one peculiarly adopted to the precise conditions of each case. It is, in fact, the fixity of the conditions pertaining to mass production that afford favourable groundwork for refinements in production regulation. Beyond that, the very fact that the methods adopted as the result of particular experience are refinements, makes them ill-adapted to the cruder conditions incidental to production that is not within the category of mass production. It seems better in all the circumstances to take as the basis of discussion conditions of production that are less fixed and, therefore, not susceptible to any refined balancing of the plant to eliminate the liability of interruptions of operations.

Assuming that the scheme of handling work in large batches usually breaks down in practice, there seems a need to arrive at a compromise in the matter so as to minimise the risks of interruptions and delays.

The contention is made that the size of a batch of components should be such that it will be feasible to lay down a hard and fast rule that the batch shall not be broken at any operation. This means that the batching for each kind of component must be adapted to the delivery requirements on the one hand, and the time required for the operations on the other.

This question of the proper size of batches is in no sense academic, for under none but the rarest circumstances will there be a margin of time as to delivery, that will allow the work to accumulate at one operation before some portion is passed on to the next operation. There is a right time for starting every operation, neither too soon nor too late, and only by doing the proper work at the proper time can any serious or successful attempt be made to live up to a schedule of deliveries.

The deliberate disintegration of an order into sub-orders or batches is to neutralise the effect that interruptions will have as to throwing out of gear the delivery scheme on the order as a whole.

If the batching, however, only represents ideals of what one would like to carry through at one setting at each operation and ignores the severe practical limitations of the particular shop concerned, then it is likely to be only a delusion and a snare, and will be little better than handling the whole order as nominally one batch.

Sub-division
of Production
Orders.

Sometimes the idea regulating the size of batches is not so much to regulate production as to get costs of production without having to wait for the completion of the whole order and also of comparing the costs of successive batches. Here again the liability of batches, decided upon in this arbitrary way, becoming divided or split at one or other operation makes it nearly, if not quite, an impossible task to obtain reliable allocation of time spent on each nominal batch.

When, however, the batching is planned on the lines already indicated, so that no interruption of any operation need be tolerated except as between succeeding batches, then there need be no difficulty in identifying each batch right through its course by the sub-order reference covering the batch, and correct wages allocation becomes reasonably assured.

The fact that the batches are made small enough to be manageable does not mean that a number of batches shall not be dealt with in succession at any one operation if the machine concerned is available. What it does mean is that, if any batch is started on for any operation, at least that batch must be completed as to that operation, before diverting the machine to another job.

Further, it is not essential to this principle that each batch must be completed for the one operation before being passed to the next. The next operation may be started just as soon as its progress is assured against being held up through overtaking the work coming through from the preceding operation.

The matter of defective work, whether arising through faulty design, material or workmanship, often plays havoc with the best laid schemes of production, and the system of sub-orders advocated may be made to lessen the risks of delay or oversight in obtaining replacements. It may, to that end, be practicable under some circumstances that no batch in which any item has been rejected shall be proceeded with until the replacement is to hand, so that it may again go forward complete in point of quantity. This replacement may be put in hand under a separate sub-order reference, consisting of the original sub-order number prefixed with X and carried through the operations necessary to bring it to the same point as the original batch—possibly in association with other batches. When the replacement joins up with the original batch the X reference drops and the *status quo* is restored.

Replacement
of Defective
Work.

p. 155.
p. 166.
p. 167.

**Replacement
of Defective
Work.**

The feasibility of applying this principle will be greatly enhanced if reserve stocks are held of rough components against such contingencies. In standard products, it is likely to be better not to make up for rejections, but to reduce the quantities called for by the stock production orders accordingly.

**Diversion of
Components
in Progress.**

Another problem, especially in the machine shop, is that arising from the diversion of components in course of manufacture for one order to some other more urgent order. This diversion or transfer may have to be effected at any stage of production. As regards replacement under the sub-order that is robbed, this can be dealt with best on the same lines as provided for the replacement of defective work. A fresh sub-order becomes necessary for the transferred component or components. With batches of the dimensions likely to accord with the principles outlined here, the proper course may be to complete the whole batch in hot haste before diverting any of the components. In any case there is room for much discretion.

p. 580.

The difficulty in the transfer of the costs may be got over by having an estimate made up on a viewing report detailing the condition of the work and reasons for diversion. This is suggested as affording a convenient routine and one consistent with making good the transfer as a replacement under the original sub-order reference.

**Progressing
and
Work Depot
Routine.**

Having dealt with the sub-division of production orders on lines that will make it possible to marshal or regulate the work in progress the next stage is to discuss the medium by which the regulation shall be affected and generally the questions arising under this heading, which is here called "progressing" as a short and generally admitted term.

Progressing is not, however, merely the regulation of the sequence or priority of the work in the shops, however important that aspect may be, but includes the larger outlook of seeing that drawings assembly lists, patterns, tools and material are all ready at the proper time. The settlement of what is the proper time follows

from the laying down of a production schedule for each order and these schedules in turn hinge on the production programme as a whole.

p. 8.

Progressing falls naturally into three phases :

- (1) Preparations for production, *i.e.* drawings, component lists, patterns and tools.
- (2) Obtaining materials.
- (3) Settlement of production sequence.

The preparations for production involve close touch with the drawing office, and any attempt to regulate their work owing to its character calls for an authority free of departmental bias. It may be best done by the works manager operating through the production estimator.

**Progressing
and
Work Depot
Routine.**

The works office will perform the function of settling the due dates for materials to be received and for production to be completed, so as to co-ordinate every stage with the actual delivery requirements. The works office can also prepare the purchase requisitions for materials entering directly into product in view particularly of the question of reserve stock.

Turning to the second phase of obtaining materials, this is discussed at some length under the heading of materials. It is recommended that the buyer should collaborate with the storekeeper in looking after deliveries. The works office may very reasonably exercise some oversight in the matter, in case the general stores should omit to give appropriate attention to any purchase order.

p. 285.

The third phase, that of production sequence, can be best dealt with through the medium of a work depot situated in close proximity to the shops concerned. The work depot is a clearing house for work in progress rather than a stores, hence the distinctive name adopted here.

The routine of the work depot can with advantage be made to include the issue of machining and assembling orders, following the lead that may be given by the works office on the assembly lists. If the work depot chargehand has the requisite judgment he may be left with a very free hand as to these batch orders and the programme adopted should be set out in detail for each order. Some freedom of action is necessary to allow the varying shop conditions to be met with discretion. He should be responsible to the head of the production section in the works office—an official, who in a large works, might be termed *production regulator* rather than the not uncommon term of production manager.

F 104.

The form of the job or sub-orders for machine work, may conveniently be that of a tag or tally designed to accompany the work through the shops, and called a work tally; it is in effect a batch order or order for a specified batch or quantity of components. It may provide for entries by the viewers after each operation, if such viewing is in force, and in any case provide for the entry as to any rejected or transferred items. The tallies should also bear the dates by which the components are to be finished, which may conveniently be expressed as the "due date." The routine in connection with

F 100.

**Progressing
and
Work Depot
Routine.**

the issue of work tallies is indicated alongside the specimen form F 100.

Once a work tally is issued, the instruction it conveys should be binding, except it be revised in proper form by the work depot.

The work tallies should have a perforated counterfoil which on issue of the tally, is detached and retained in the work depot as a tracing coupon to show the work outstanding in each department.

On completion of the batch of components covered by any work tally reference no., the respective tracing counterfoil is sent on to the works office as a notification of work completed.

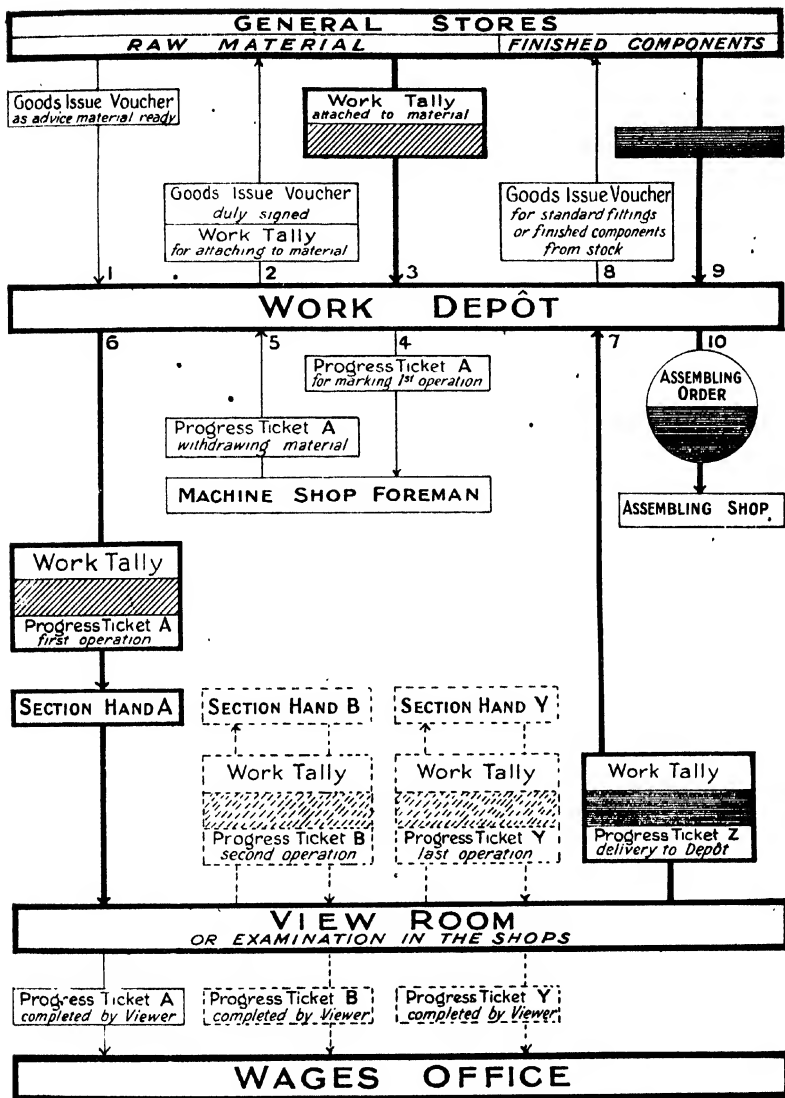
The work depot is primarily a collecting and distributing station for all work in progress. Its functions and responsibilities come normally with the receipt of material from the general stores, though it may be concerned with obtaining deliveries to time from the foundry and smithy when they form part of the works. Castings and forgings bought outside should be looked after by the general stores.

In receiving material from the general stores, the work depot F 86. can very reasonably sign, and if need be originate, the requisite goods issue vouchers. In doing so the order reference will be that of the production order itself, as the machining or sub-order will have come into being. This, of course, is better for the general stores as giving the reference that they require and expect, though as a consequence, when the vouchers reach the works accounts office it will only be possible for them to allocate the material to the production order, whereas the wages can be allocated to the work tally or batch references. This is hardly a fault, however, as the value of batch costs lies mainly in their relation to wages and the almost useless splitting up of material costs to correspond will be better avoided thus saving a good deal of clerical work. It will be necessary for the work depot to advise the works accounts office by means of F 103. daily list as to work tallies or machining sub-orders issued, or, in case of assembling or erecting sub-orders by means of carbon copy of same if that involves less trouble than a list.

In the case of special purchases, the general stores can with much advantage originate the goods issue vouchers as an advice to the department concerned, and under the present proposals, this means, for the most part, the work depot, as being the collecting centre for the machining and assembling departments.

p. 298.

The work depot may elect not to receive at the moment material thus advised and can hold the open goods issue vouchers F 85. as reminders accordingly. The goods, it is recommended, should have been labelled in the general stores with a stores tally bearing



[II F—p. 156—Shop Control.]

[IV C—p. 311—Issue of Stock.]

ROUTINE DIAGRAM.

Illustrative of production regulation conducted by the Work Depot.

F 82.
Progressing
and
Work Depot
Routine.

the G. R. (goods received note) reference and this G. R. No. can be indicated on the goods issue voucher, so that no mistake should arise from any delay by the work depot in accepting material. This virtually places the facilities of the general stores for temporary storage at the disposal of the work depot.

Further, the work depot may decide to take only part of the material available, and this will be handled by making out new goods issue vouchers, and marking off the quantities thus taken from the original voucher sent in as an advice by the general stores. The general stores on their side will mark off the partial issues on the respective stores tallies.

This partial withdrawal of material is an essential condition where reserve material is ordered together with that known to be required.

p. 300. F 56. It will be better that the control of this reserve material shall be vested in the works office and that they shall apply the material by issuing suitably marked goods issue vouchers to the work depot, and at the same time send corresponding stock
p. 522. F 55: appropriation tickets to the general stores.

In the matter of what may be termed "bulk" material, such as bars and sheets, the goods issue voucher routine is not so simple as in the case of, say, castings, and the point as to such material being frequently drawn in excess of requirements is dealt with on page 312. In the present connection, no particular point arises for different treatment by the work depot unless it is that a distinctive colour of work tally for components made from bulk material may be useful to the foreman while the work tally is in his possession prior to drawing the material for same from the work depot.

How far it will be right to have material of this character moved from the general stores to the work depot and then from the work depot to the shops must depend on relative locations and weight of material. The work depot could conduct their part of the routine, by arrangement with the general stores, without actually receiving the material.

The important feature of the work depot routine is to see that the material is ready for the shops and incidentally to relieve as far as possible the foreman of clerical work in this connection.

It would not be necessarily going outside the proper province of the work depot if it were to direct the moving of material about up to, say, the first operation. If the work depot has its own labourers, there is likely to be a considerable gain of speed in getting material deposited in its right place, but it depends on supervision and other factors. One objection may be that the general stores will not manage with proportionately less staff and so far as this is unavoidable, care must be taken that any extra expense in

labourers' wages must be amply recovered by increased output from the shops. It may on that account be best for the general stores to be responsible for delivery of material to the work depot and for the shops to collect material from and deliver product to the work depot. Matters of this sort are outside any definite ruling as being dependent on both the local geographical conditions and also local administrative conditions.

**Progressing
and
Work Depot.
Routine.**

Usually it will be better practice for the work depot to make out a progress ticket for each batch of material ready for issue F 97. and send this ticket to the foreman concerned for marking the first operation. This routine is indicated on the diagram on page 153.

If an entry is also made by the foreman on the progress ticket as to the particular machine or worker to which the material is to first proceed, this can be an instruction to the labourer, who lodges the progress ticket at the work depot, where to put the material when obtained. This information as to first operation can be noted on the work tally counterfoil and the corner of same can be cut F 100. off to show that the material has been drawn.

The question comes in now of the use to which the work tally shall be put and the best way is to have it accompany the work as an identification label and as affording the cross reference to the production order no. Beyond that it should serve as a summary of any rejections, thus keeping check of the number belonging to the batch as it proceeds through the shops. The original batch may be made up to strength by the accession of replacements which, it has been suggested, should be handled up to the point of joining the original batch by a supplementary work tally bearing the original batch order reference with a qualifying X before it. The merging of the replacements with the original batch will be noted on the original work tally and the replacement tally cancelled.

p. 149.

It is doubtful if the work depot can usefully extend its activities actually to the shops beyond perhaps delivering the material to the first operation. It is better to make the shop foreman responsible for all the further steps up to the delivery to the work depot of the finished component, unless a production order is suspended, in part or altogether, when the work depot should take charge of all the suspended work.

p. 526.

The work depot functions largely in the collection or assembling of the finished components for issue to the assembling shop for fitting F 101. up as assembly units, under assembly sub-orders and later, perhaps, F 102. will issue the assembly units for final erecting under erecting sub-orders.

**Progressing
and
Work Depot
Routine.**

The work depot will draw standard fittings from the general stores in accordance with assembling requirements and thus save the assembling shop foreman a great deal of work.

The use of trays and trolleys adapted to the various styles of assembling units is to be strongly recommended. These receptacles should convey the components to the assembling shop, possibly remaining there until assembly is completed.

It is particularly desirable that the sets of details for assembly units shall not be issued unless complete in every particular, and further, that the sets shall not be passed out of the work depot until the assembling shop is ready to start work on them. This will greatly minimise the losses of the smaller details, so likely to occur when the details lie for any length of time in the shop. It also prevents general damage and deterioration of finish.

**Shop
Control.**

p. 159.

So far no provision has been discussed for the machine shop foreman to know what work he has in course of machining except by actual survey in the shops unless he makes the assembly lists serve as a record. This means a number of entries, and the inference to be drawn from such a record is not always clear at a glance. Again, while the foreman may be posted well enough by his assembly list, the section hand immediately in charge of the respective processes, e.g. drilling, milling, requires some other record.

The assembly list may, of course, be re-grouped to suit the various shop sections, but there is little doubt that some sort of delivery ticket for each batch offers the best mechanism for supervising the sequence of the work. These tickets can be conveniently designated progress tickets, in view of their usefulness in guiding the movement of work about the shops. Obviously by the progress tickets received each section hand can tell the volume of work before him and can possibly arrange the tickets tentatively, according to the operators under his charge. Before doing that he should jot down in a work book the work tally references of the batches, as they reach him, entering them on separate sheets according to the production order reference. This enables him to discuss the position, so far as he is concerned, of any given production order, with the foreman or with the works manager. Large contracts could have separate work books. The section hand would probably not enter up the very short jobs that come to him for attention.

By means of the progress ticket an effective routine is provided by which viewing and moving of work is facilitated, and the work of the foreman lightened.

The progress ticket for the first operation is made out as far as possible in the work depot, and sent out to the machine shop

foreman to notify that material is ready. The foreman fills **Shop Control.** in the first operation when he is ready to take out the material. It thus serves as an instruction to the labourer exactly where to deposit the material—the progress ticket being handed at the same time to the section hand concerned.

The progress ticket will be collected by the shop viewer or examiner—if work is viewed in the shop—or sent by the section hand to the view room with the work.

The progress ticket will be completed by the shop viewer, or in the view room, as a viewing certificate. It may then be passed to the work depot for noting as to operation completed and pieces rejected, if any, but in the ordinary way, the work depot will not attempt such a record, and therefore the progress ticket, on completion as to viewing, may be put in the works post, and thus pass to the wages office for attaching to the respective job tickets, for purpose of computing extra pay due.

Whoever completes the progress tickets for the completed operation will make out a new progress ticket for the next operation. Conceivably, viewing may only take place after specific groups of operations, in which event the progress ticket should indicate same, so that the application of the viewing certificate on the progress ticket concerned shall be clear to the wages office.

Thus the cycle is repeated until the last operation is reached and delivery is made to the work depot. A new progress ticket is necessary as an instruction for moving the finished components to the work depot. The foregoing routine is graphically illustrated in the routine diagram given on page 153.

When any product is completed in accordance with the production order concerned, the work depot will send the product to the warehouse, *i.e.* the finished stores for saleable product, accompanied by a suitable delivery note. Duplicates of this note should be sent to F 108, the works office for recording progress and to the works accounting office for account purposes. Under some circumstances the work depot may be called on to furnish finished weight cards to the F 109, drawing office for all new products.

Work tickets are sometimes distinctively coloured to indicate **Urgent Work.** urgent or “rush” work. There is one objection, at least, to this course and that is that urgency is not always evident when the material is first issued and, moreover, on a given order, all the parts are not equally urgent, inasmuch as some may only involve short operations.

If any scheme of marking work as urgent is adopted it must be treated seriously throughout, and this will mean the exercise of

Urgent Work. careful judgment. The best compromise usually will be to prepare work tallies in the ordinary way and then for a progress clerk, tracer, chaser, worrier—whatever his designation—under the direction of the works office, to officially mark the tallies referring to the work that has positively become very urgent. A large letter rubber stamp "V.U." will meet the case and it must then be understood clearly that this sign must be respected and acted upon.

F 104 The basis of this urging action should be arrived at by a knowledge of the components, due for completion in a given week to meet the delivery schedule, as worked out in the works office, that are not delivered to the work depot according to that schedule. This means, in other words, making up a shortage list of components required for assembling purposes a certain time ahead of actual assembling shop schedule requirements and concentrating attention accordingly, during the period thus available, on the components still wanted. Incidentally it may be remarked that due dates should be week ending dates so as to facilitate the rounding up of work in progress.

p. 23.

Carried out to its logical conclusion, excessive overtime may be necessary at times to live up to the schedule, but there is little doubt that the driving force of such a scheme under proper administration is enormous. The dangers of scamped work being tolerated by foremen and viewers under such circumstances are not, however, to be lost sight of.

When an order has become very urgent and the work tallies have been stamped "V.U." accordingly, progress tickets of distinctive hue may be usefully employed to indicate the urgency very plainly to the viewer, the shop labourer (who moves the work to the next operation and possibly works directly under the viewer), the next operator and his section hand.

II G

FOREMANSHIP AND INSPECTION

THE proper place of foremen in industrial administration calls for much more consideration than is commonly given. Duties of Foremen.

A foreman is appointed over a group of workers as providing the convenient single medium for the management to convey the necessary instructions to all the workers and to get those instructions carried out. Supervision is thus the acknowledged primary function of a foreman and under conditions of simple processes his responsibilities may seem quite light.

p. 87.
p. 112.

None the less, supervision is not the simple function it is apt to appear to be to the uninitiated. Its complexity becomes the more real as the status of the worker rises and as the freedom of the foreman to be autocratic disappears. Whatever may have been the case in the past in any particular works, it is certain that in the near future in all works the foreman will have to exercise his functions in a restrained and reasoned way and he will have to possess a much higher standard of intelligence and human understanding than passed muster in pre-war days.

The difficulty in the way of a widespread improvement of foremanship standard is the lack of opportunity for education on helpful lines.

Management has been in the habit of devolving so many duties on the foreman, as manufacturing conditions became more complex, that he has been robbed of the time necessary to do justice to what might be called the humanistic side of his work. This indiscriminate loading up of the foreman has developed in time the autocratic habit without which he would have been unable to manage his department at all. He has not, in effect, been given time to do right when doing right meant investigation first of what was right.

There are foremen of such natural administrative ability that they are able to carry out their multifarious duties with some show of efficiency and some regard to the individual worker. In numerous

Duties of Foremen.

cases they are ill-chosen for the work and yet their deficiency is not apparent to the management for lack of knowledge on its part of what constitutes efficiency on the one hand, and proper treatment of the worker on the other.

Foremanship represents a degree or expression of management and, in the mind of the worker, management is, as yet, synonymous with the employer, or, in other words, capital. From this it follows that the shortcomings of management are counted as the shortcomings of the capitalist system.

There is so much native intelligence amongst the workers that they do, amongst themselves, direct the most searching criticism on their foreman and managers. Foremen, being usually promoted from the ranks of the workers, and by their continuous contact with them, are the more sensitive to this largely unspoken criticism. They are apt to develop a tyrannical attitude from an understandable, however mistaken, idea of their position of authority, which they consider is in itself sufficient to answer all criticism from those whose labours they direct. Robbed of this defensive armour, as undoubtedly they largely are now, it will be necessary for them to recast their minds and to hold their position on personality and unassailable merit, of which a high standard of equity is no mean part.

The movement, such as it may be, for workers to have the right to nominate their own foreman is partly a reaction from the want of knowledge and judgment exercised by managements in earlier days, both as to the choice of foremen for their driving force only and, particularly, as to giving them too much to do to be able to deal with individual temperaments of the workers. As a noted labour leader has expressed it, no one in charge of horses would neglect to give the utmost consideration to their various temperaments—and the horse is a noble animal, to quote the early copy book—yet workers are supposed to be all of one type, obedient to one strident call of authority. Unfortunately, apart from willingness and ability, it takes time for a foreman to learn the temperament of each worker and act accordingly; and therein lies the crux of this considerable aspect of foremanship.

One of the serious problems of reconstruction within the factory, undoubtedly, is to adjust the relationship of the foreman to the worker and the necessary preliminary is to ease the foreman's duties in other directions.

With the advent of a works co-ordination committee, as described on page 187, the foreman comes under a stronger searchlight than ever but it is quite possible for this to be turned to good account by the development of a better understanding between the workers

and himself. Great issues hang on this aspect being intelligently fostered. Duties of Foreman.

Apart from this humanistic aspect, there are large questions to be faced of obtaining production efficiency and anything short of efficiency is inefficiency. If this be considered then the determination of the standard of efficiency possible is a vital first stage.

The intimacy of a foreman with production does not, of itself, qualify him to have any correct standard of efficiency and by the nature of his work he is almost precluded from studying the question at sufficient length to arrive at a trustworthy judgment. His qualification is limited practically to making comparisons of present performances with past performances—just indeed as a costing system is limited. The measuring of production efficiency in absolute terms is a matter of computation—a matter of facts and speeds in fact—as discussed at length under Production-Estimating, Section, II D. This calls for special training and a production-estimating or rate-fixing department can prove of enormous help to the foreman and it is difficult to conceive of an efficient shop without this skilled auxiliary service.

p. 111.

Another main duty of a foreman in the ordinary way is feeding the shops with raw material and then allotting the various operations on that material with due regard to delivery dates and quality of workmanship.

The attainment of a promised delivery date for the complete assembled product involves a wide range of activities, as indicated below, which have to be attuned to that programme :

p. 145.

Working drawings to be supplied to the shop.

Material to be requisitioned, purchased and delivery obtained.

Foundry patterns to be made.

Sequence of operations to be settled.

Special tools and gauges necessary for efficient production to be specified, designed, and made—this hinges on the sequence of operations.

Material to be issued to the shops in conformity with programme.

Examination of work for quality after each operation or group of operations—alternatively, much waste will result at assembling and faulty workmanship be encouraged.

Replacement of defective and spoilt material.

Fixing of job rates for each operation under any individual payment by results system.

Booking of time for administrative and cost allocation purposes.

Duties of Foremen.

Obviously these matters could not be dealt with by any one foreman and some of the functions are outside the scope of foremanship however broadly considered. Experience has established clearly that if the foreman of the manufacturing shop is to reach his highest expression of efficiency, not one of these functions should be carried out by him. They require to be carried out by independent persons or departments specialising in the respective directions and co-ordinated by a production control department.

As set out in the author's book on *The Management Problem*, the foreman's responsibilities under a fully constituted system of production control may be summarised as follows :

Accuracy of work as determined by the percentage of pieces that pass the test of viewing.

Economical production, as shown by the gains or losses on the premium or piecework rates stated for each operation.

Punctual production as indicated by the way in which " due dates " or dates at which particular parts should be finished, are observed.

Apart from the functions arising directly under production control as here considered, a number of other duties have to be performed by the foreman, viz. :

Selection of workers.

Training of learners.

Allocation of duties and day to day instructions.

Withdrawing materials from stores.

Transportation of material about the shop.

Supplying each worker with his next job.

Providing for absentees.

Setting of machines as to tools, feeds and speeds.

Shop discipline as to output and behaviour.

Questions of safety and fatigue.

Maintenance of plant efficiency.

p. 23.

Emphasis may be laid here on the great benefits that can be derived from the practice of the works manager meeting the foremen regularly in committee to discuss interdepartmental working.

The desirability, if not absolute necessity, of first carrying the foreman's favourable verdict in any schemes touching the working of the shops makes it necessary to start gently with new developments. The point to be borne in mind is that the foreman and chargehands represent the management in dealing with the workmen, and if the former become disaffected the disturbing influence consciously or unconsciously exerted on the men may be disastrous.

A point may be made as to the responsibilities of foremen for such matters as machine guards—this has been held to be their legal responsibility—notification of accidents and Factory Act requirements generally, including overtime restrictions affecting young persons under 18.

Duties of Foremen.

F 38. p. 192.

A reference is necessary to the method of paying foremen and chargehands. When a standing wage is paid there is more likelihood of time being lost in the mornings, though this may be met by a bonus scheme in which punctuality is recognised, while in the matter of overtime there may be undue reluctance to stay behind when the men are working late. If, on the other hand, an hourly rate is paid there may be unnecessary overtime worked, though a foreman or chargehand guilty of that ought to be found out in one way or another as unfitted for his post. If any risk has to be run it is better to run the risk of paying a little too much for supervision than not to have enough supervision.

Payment of Foremen.

The usual course is to pay the foreman a standing wage and to pay the charge hand at an hourly rate. This latter is not good in practice. The chargehand is expected to have the employer's interest at heart and is expected to supervise, while on the other hand his treatment, status and privileges are practically those of the workmen he controls. The two are opposed in principle, and it is not surprising to find that the supervision and outlook of the hourly rated chargehand approximates to that of the workman.

The better plan is to grade all supervising chargehands as assistant foremen and place them on the staff.

One consideration that seems to influence some managements to pay hourly rates to chargehands and allocate their time directly to production orders is to increase the production wages basis and reduce the proportion of oncosts. This sometimes amounts to deliberate deception of the directors. The principle advocated of treating any supervision allocated to production orders as secondary wages—not carrying oncosts—would eliminate the main fallacy of this method.

p. 450.

It is of particular importance that foremen and assistant foremen should be assured of personal support from the works manager and have a sense of reasonable security in their appointments.

Another step in the right direction is to institute a bonus scheme for foremen and assistant foremen, in fact, where the system of working has been changed from time to piecework or premium, something will be found necessary, either on these lines or in the shape of an increase of wages, owing to the increased earnings.

Bonus to Foremen.

p. 25.
p. 231.

Bonus to Foremen.

p. 252.

possible on the part of the workmen and the fact that foremen's wages are usually relationship to workmen's wages. To arrive at satisfactory scheme offers many difficulties, human nature being what it is. One of the simplest, and one which can give good results, is to pay the assistant foreman and chargehands a bonus either the same as or based on the average percentage of extra pay earned by the workers under them. This should never be done however unless the ratefixing is carried out entirely independently of the foremen. Even then a weakness lies in the difficulty of eliminating entirely the wrong side of a foreman's influence. It is natural, in fact it is desirable, that the workers should, if they wish, speak to their foreman regarding rates which, in their opinion are set too low, because, if the rate be actually sufficient, the workman will, or should be, told so by his foreman. The objection therefore to paying a bonus to foremen on the percentage of the workers' extra pay is obvious. By so doing, the foreman is given an interest in large percentages being earned. Large percentages are made possible by big outputs and high job rates, and while the bonus so paid ensures the foreman's interest in output being keen, it also offers an equal interest in high rates. Of course, many foremen would be proof against this but it is the principle which is wrong, and, after all, it is principles that chiefly matter in the long run.

A more satisfactory scheme from every standpoint and one which tends to co-ordinate output to the obtainment of the finished product rather than the manufacture merely of a large number of items, which may, as under the scheme first mentioned, not unreasonably include the jobs which are known to "pay" best to the exclusion of the jobs more urgently required which "do not pay" so well, is to pay a bonus on output, as shown by delivered goods. By so doing, the interest of each person participating is directed towards completing those details required most, which again on principle is correct.

There are various methods of basing this payment. Numbers delivered can in some circumstances serve the purpose quite as well as value of product. With numbers delivered, it is necessary to fix a basis rate per item, while, when value of product is the basis, a percentage can be fixed and remains permanent. In this latter case, however, it is sounder if the value of the product be taken as labour value, because it is quite possible for two products with equal sales values to be widely different in material values.

One essential safeguard is to demand a minimum total value of saleable output before bonus becomes due, and to insist on this

minimum being maintained. This tends to prevent financial difficulties and loss of turnover through erratic deliveries. Bonus of Foremen.

With any system of bonus to foremen, the payments should be so based as to be increased by good timekeeping, good timekeeping being understood to mean not merely not losing time, but being punctual and always ready to commence supervision duties the moment the starting bell has sounded. This point becomes of increased and vital importance with the shortening of hours.

Undoubtedly a rightly conceived bonus system for foremen can have a wholesome effect, not only on the regularity of deliveries but on the total output.

Some of the principles affecting inspection of product are considered under the question of Drawings on page 89 and of Shop Control on page 156. Some discussion of final inspection is provided under the heading of Final Inspection on page 319. Shop Inspection

There remains to be considered here, more particularly, questions of shop inspection.

Shop inspection should, as a matter of principle, be carried out by staff independent of the shop foreman and any other course is economically unsound, as unbiassed investigation would prove where the principle of independence is not accepted. Those employed in this independent inspection are not uncommonly known as examiners or viewers—the term inspector being often reserved for the official responsible for final inspection before despatch. Viewing, to adopt the shorter term, is usually conducted from a view room, where the work is actually brought for viewing or the viewer may go to the work.

The principle of inspection being independent of production should not only rule out the passing of work by foremen but where there is a shop or works superintendent responsible to the works manager for production, then inspection should be under an inspector also directly responsible to the works manager. Alternatively in a smaller organisation, the viewer could be directly responsible to the works manager.

Viewing means verification, and is suitable as a distinctive term for viewing between processes and operations and on the completion of the component ready for assembling. Viewing after that stage is more of the nature of final inspection.

F 99.

The extent to which viewing is carried out will vary with conditions. Where the interchangeability of high grade work is in question, there must be viewing either between every operation or after certain groups of operations. The decision as to the viewing stages should be embodied in the operation schedule, if planned F 58.

**Shop
Inspection.**

ahead. If interchangeability is seriously attempted, the viewing necessary for that purpose may be expected to meet the requirements of a piecework or premium system, and, moreover, will hardly be lessened under a timework system.

p. 90.

The application of limit gauges has been already sufficiently referred to, as also the advantage of indicating on the various drawings the appropriate size limits, either in actual dimensions or by reference to a table by means of a symbol.

It may be remarked here that it is eminently desirable to have a separate set of gauges for view room use as a check against the accuracy of the gauges in shop use.

It is usual and necessary for each viewer to have his own particular stamps for marking work he has passed. This may be by initial if only one or two viewers, but otherwise by symbol. Sometimes the marks are varied each year so as to roughly date the work.

p. 156. F 26.

In regard to the routine of passing job tickets, it may be taken that a viewing certificate in some form or other is essential for purposes of payment by results. The certificate may be given on the job ticket itself or on a separate progress ticket. The possibilities attaching to the latter scheme are discussed under Shop Control.

F 97

A rule is sometimes laid down that no job ticket may be passed except the batch in question be completed as originally intended. This means holding up the job ticket and any extra pay due to the worker thereon, until replacements have been put through to meet any rejections at the operation in question. It can hardly be doubted that, when any parts are sent back by the viewer for correction, the rest of the batch ought to wait until the correction has been effected, except in rare cases.

p. 149.

The advantage of holding up job tickets until the batches in question are completed lies in making the shops interested in getting replacements put through as promptly as possible, and therefore, as cheaply as possible. Regulation of the work in progress is vastly facilitated by the certainty of getting the full quota ordered in each batch or sub-order.

F 100.

In the matter of work done in automatic and semi-automatic machines it will usually be desirable to get specimens of the work viewed before proceeding with the bulk.

It is usually advantageous to indicate on all work tallies the operations and quantities passed, though this course may only be imperative in the case of split viewing, that is when the whole batch is not dealt with or only part is sent forward on account of rejections.

Turning to the matter of rejections these can be conveniently reported by means of a simple viewing report. Such reports require to be in triplicate so that one copy may go immediately to the works office production section to provide for attention being given to replacement and investigation, while a second copy goes to the work depot with the rejected material, the third copy being retained by the viewing chargehand. Probably the works manager will want to see all rejections before same are passed to the stores department for disposal.

Rejection
Routine.
F 98.

Instances of doubtful rejection, equally with errors and deficiencies in drawings or lists, or any other discrepancy coming properly under the viewers' notice can be dealt with by a viewing report.

F 87.

The copy sent to the works office can be passed on to the production estimator for appraising the cost of material and labour wasted. This appraisalment may be written on the back of the viewing report and same sent on to the works accounts office for adjustment of the cost accounts, on the lines discussed in that connection.

p. 469.

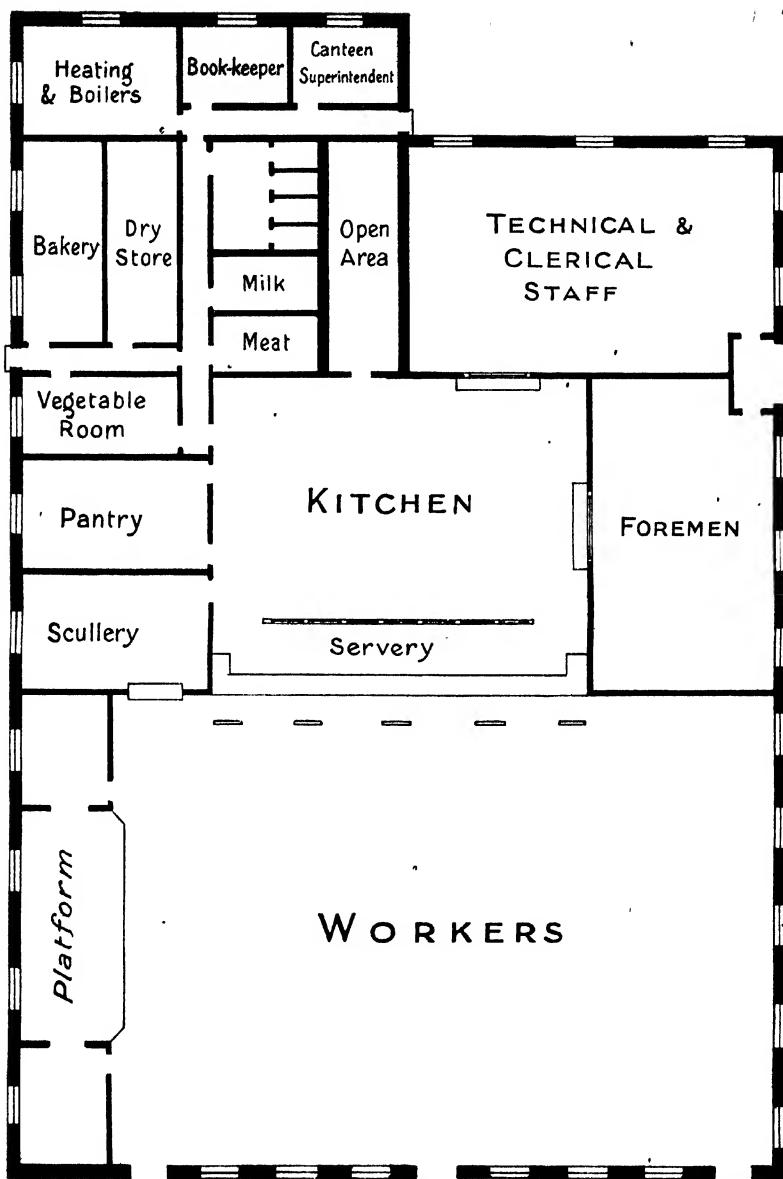
It is necessary to make a ruling that no replacement may be put in hand, and no drawing or list corrected except on the basis of a viewing report. The necessity in the case of drawings and lists arises from the need of all the proper parties to trace the effect of such corrections once a drawing or list has been issued. In the case of errors detected in the drawing office, or of suspensions of work on certain components being found necessary, the routine could be for the drawing office to issue, through the works manager, an instruction accordingly to the shops. The view room could look into the position of the work in question and proceed to make out a suitable viewing report.

p. 149.

F 49.

p. 357.

In the matter of investigation of rejected work the production estimator may fill a valuable rôle as adjudicator on the cost of all errors and defects developed during manufacture. He may advantageously prepare periodical reports, say fortnightly, to show the amount of defective work for which each department has been responsible, including in this the drawing office, buying department, and any office department concerned. These reports have been found to exercise a most salutary influence all round in keeping down this waste of money. The arrangement is also sound in providing a total figure of these costs, without sacrificing the advantage of including the costs under the respective production orders in the cost accounts proper.



[II A—p. 81—Canteen, and Assembly Hall.]

[III J—p. 268—Provision of Meals.]

DESIGN FOR WORKS CANTEEN.

WORKS MANAGEMENT

III

LABOUR ADMINISTRATION

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III A

INDUSTRIAL RELATIONS

IN proceeding to consider the subject of industrial relations, ^{Official} the outstanding difficulty is to confine enquiry within bounds ^{Reports.} appropriate to the present work.

There is, of course, no question that a works manager of to-day should have a wide vision in these matters and adequately appreciate the development and tendencies of industrial thought amongst all classes in their political, economic and social effect, without waiting until it has direct bearing on the activities of factory administration. Hence it would be quite within the present field of labour administration to deal at length with these industrial conceptions, but limitations of space must confine the reference to the more general aspects of industrial relations and this can be best served by quotations from the more important official reports in this connection, representing in that a consensus of opinion rather than the ideas of any single individual.

Of such reports there are two of outstanding value (1) the Memorandum issued by the Garton Foundation in October 1916 but privately circulated in May and June 1916, and (2) the reports of the Whitley Committee, of which the first report was issued in the following year, viz. March 1917.

The Garton Memorandum not only formulated the proposals for joint industrial councils and works committees as adopted later by the "Whitley" Committee but traversed the whole position of industrial relations in a very able way. It is of particular interest to note the recognition in the Garton Memorandum of three parties to industry, viz., Capital, Management and Labour, although both reports are in agreement as to the constitution of the Joint Industrial Councils as two equal panels, of employer and employed.

There is the obvious difficulty in recognising management as a separate group because many employers are their own managers—on the other hand the salaried manager is the more common

Official
Reports.

condition of factory government. To assume that he holds office purely as the paid representative of capital and is without a separate entity is to refuse to Management what is now being readily granted to Labour, which is paid by the same Capital and yet carry relatively little responsibility in its individual members.

Both reports are of great value and the definite recommendations in the "Whitley" reports as to the organisation of Joint Industrial Councils have, with the moral support of the Government, found widespread acceptance and at least prepared the way for much good.

Extracts from both reports are given on the following pages, which are deserving of very careful perusal.

Garton
Memorandum.

Memorandum on the Industrial Situation after the War¹
(The Garton Foundation)

OCTOBER, 1916

FOUNDATIONS OF INDUSTRIAL PROSPERITY.

✓ The foundation of industrial prosperity is production. The material well-being of a nation demands first, the attainment of the possible maximum both as regards volume and quality of output, whether of goods or services; secondly, the elimination of all waste of material or effort in the process of production; thirdly, an equitable division of the proceeds of industry, enabling all those concerned in the creation of wealth to obtain a reasonable share of its material benefits.

✓ The accumulation of surplus wealth which we call capital represents the balance of production over consumption in previous years and is constantly being added to or diminished in accordance with the ratio of goods produced to goods consumed. When that accumulation has been depleted, the deficiency can be made good only by an increase in the annual balance. It will be necessary to encourage economy in the consumption of goods and the investment of the resulting savings in productive industries. We must work hard and efficiently in order to produce more. We must spend less on luxuries in order that we may save more. We must increase confidence in the national ✓ industries in order that savings may be attracted into the right channels.

Increased production, increased saving, increased confidence—these are the three keys to the whole problem.

✓ Much of the limitation of output on the part of Employers arises from inefficiency in management—conservatism in methods, the retention of badly-planned works and out-of-date plant, bad organisation, neglect of scientific research, the presence of "deadheads" on the office staff.

✓ We must look for greater production rather than increased efficiency than from an increase in the number of hours worked. There are, however, large sections of Labour by whom a further limitation of output is deliberately practised in the assumed interests of their class as a whole. In some cases the motive is the honest but mistaken belief that the less each man does the more work there will be to go round. "Work" is regarded as an exhaustible fund, or at the best as a diminishable flow, and it is assumed to be in the interests of his class that each man should "use up" as little as possible. The fallacy lies in the conception of an inelastic "wages fund." Wages come out of the stream of products, and other factors remaining constant, the distribution of wages cannot be widened except by an increase of the stream.

¹ Extracts, by permission, from Memorandum published by Messrs. Harrison & Sons, St. Martin's Lane, W.C.

✓ The remedy must be sought in a better organisation of the industries concerned which will give the workman greater security of tenure, and remove the fear of unemployment or relegation to lower-paid work as a result of exercising his maximum effort. A further cause of limitation of output lies in the natural differences of individual capacity. The workers believe that if each man were allowed to produce to his full power, the minimum standard demanded by the employer would be based on the performances of the quickest and most skilful and a "speeding-up" process would be introduced, involving either excessive strain or lessened earnings on the part of the majority. From this point of view, restriction of output is a sacrifice made by the ablest workers in the interests of their fellows.

Carton
Memor-
andum.

In order to make good the wastage of war and raise the general level of industrial prosperity, the efforts of both parties must be united for the purpose of increasing the quantity of output and improving its quality.

✓ It will be necessary for Labour to abandon the policy of restricting output and to concentrate upon demanding adequate remuneration for the work performed. It will be equally necessary for Employers to recognise that efficient production is the only ultimate source of profit, that the policy of keeping down wages and cutting piece rates is opposed to their own interests, and that industry as a whole will benefit by any rise in the level of craftsmanship and production.

INDUSTRIAL RELATIONS.

✓ The fundamental grievance of Labour is that while all three [Capital, Management and Labour] are necessary parties to production, the actual conditions of industry have given to Capital and Management control not only over the mechanism of production, but also over Labour itself. They feel that the concentration of Capital in a comparatively few hands has rendered fair bargaining between the parties impossible. A man who leaves his work without reason inflicts on his employer a certain amount of loss and inconvenience. A man who is dismissed without reason may lose his livelihood. While each great firm represents in itself a powerful organisation apart from any Employers' Association to which it may belong, the men employed by the firm are solitary units, having no power of collective action without calling in the Trade Unions representing the whole of each craft. In the last resort the only effective weapon of the Trade Union is the strike, and the loss inflicted by a strike or lock-out on the Capitalist Class is not comparable with the acute personal suffering of the workmen and their families. They feel therefore that in any dispute the dice are weighted against them.

✓ The attitude of a certain section of Employers who look on their employees as "hands," as cogwheels in the industrial machine, having a market value but no recognised rights as human beings, is bitterly resented. Still more offensive is the attitude which regards the working man as a very good fellow so long as he is kept in his place and requiring to be guided and disciplined, but not to be consulted in matters vitally affecting his interests.

✓ The grievances of the Employers are no less valid. They complain of deliberate limitation of output, slackness and inefficiency in work, short time and malingering, the lack of any feeling of responsibility.

✓ The gravest complaint, however, relates to the insecurity of bargaining. The Employer's power to negotiate directly with his employee is restricted by the Union, yet bargains thus made with the men's accredited representatives are continually broken by those whom they profess to bind and the Union itself cannot enforce the agreement which it has made.

✓ We may lay down these four broad principles as those which must guide our attempt to solve the Industrial Problem.

- (a) **The first necessity of the Industrial Situation is greater efficiency of production. In order to meet the difficulties created by the war, to make**

Garton
Memor-
andum.

good the losses of capital, and to raise the standard of living amongst the mass of our people, we must endeavour to increase both the volume and the quality of output.

- (b) In order that this result may be obtained without detriment to the social welfare of the community, it must be sought for rather in improved organisation and the elimination of waste and friction, than in adding to the strain on the workers, and must be accompanied by a change of attitude and spirit which will give to Industry a worthier and more clearly recognised place in our national life.
- (c) This can only be accomplished if the sectional treatment of industrial questions is replaced by the active co-operation of Labour, Management and Capital to raise the general level of productive capacity, to maintain a high standard of workmanship, and to improve working conditions.
- (d) It is essential to the securing of such co-operation that Labour, as a party to Industry, should have a voice in matters directly concerning its special interests, such as rates of pay and conditions of employment. It is necessary to create adequate machinery both for securing united action in the pursuit of common ends and for the equitable adjustment of points which involve competing interests. This machinery must be sufficiently powerful to enable both sides to accept its decisions with confidence that any agreement arrived at will be generally observed.

✓ There are many to whom these principles will not seem to go far enough. They are convinced that the only solution lies in a complete reconstruction of Society. Accordingly they reject the notion of co-operation between Employers and Employed as involving an abandonment of the first essentials of reform.

↓ But the present issue is a narrower one. We have to deal with a definite and immediate danger—the prospect of an industrial crisis following on the signing of peace. It is obvious that no measure involving a radical reconstruction of the social system has any chance of adoption in time to avert this evil.

✓ The first step towards agreement is to define the functions of the three parties to production.

✓ Capital is necessary to a business for the erection of plant, the purchase of raw material and working expenses. In order that Capital should be used to the best advantage for the purposes of industry, it is necessary that investors should display sound judgment as to the prospects and requirements of particular enterprises, exercising caution or daring as occasion demands.

✓ Management is concerned with the disposition of the Capital provided, the erection and employment of machinery and plant, the general organisation of the business, the placing and acceptance of contracts, the purchase of the raw material and the sale of the finished product. The performance of these functions requires not merely a knowledge of the particular business concerned but of all which are in any way connected with it, a careful study of markets, of methods of distribution and of financial conditions.

✓ Labour undertakes the conversion of the raw material into the finished product, by aid of the plant and machinery provided. While the first requisite in the workman is a thorough understanding of his own job, the maximum efficiency can only be attained if he has a clear conception of the part played by his own work in the whole process of production.

↓ The chief obstacle to co-operation is the question of *status*. The development of modern industry has turned the operative into a mere cog in the industrial machine. The average working man has no say in the management of the business and very little as to the conditions of his employment; he has no interest in the success of the firm, except that it should not collapse altogether; and the tendency has been more and more to reduce his work to a mechanical routine. The term “wage-slavery,” so often used, means something more than the mere economic dependence of the worker on his employment. It embodies the revolt of the worker against a system which gives him neither interest, nor pride, nor a sense of responsibility in his work. To a large proportion of those engaged in industry their work has become something external to their personal life, a disagreeable necessity affording no

opportunity for self-expression, the joy of creation, or the realisation of healthy ambitions. The result has been a serious impoverishment and enfeeblement of life and character and a permanent obstacle to industrial development. It is impossible for men in this position to take long views, or to consider innovations from the standpoint of industry as a whole. The opposition to new methods of working, labour-saving machinery, dilution of labour, scientific management, is only in part the result of specific and reasoned objections. It springs still more largely from the fact that these schemes are imposed from above and are presumed to be framed solely in the interest of the Employers. The opposition to them is, in fact, a revolt against dictation. On the other hand the uncompromising attitude of Employers does not, generally speaking, arise from a tyrannical spirit or a mere desire for increased profits, but from impatience with the men's separatist attitude and their inability to realise the common dependence of Employers and Employed upon the produce of their joint exertions.

- ✓ The same difficulty arises in the case of distribution of earnings. The worker feels that his labour is treated as a mere commodity, the market value of which may be forced down by the Employer, irrespective of any consideration of a decent standard of life for the Employed, and that he receives the reward of his toil, not as a matter of right or as the equitable division of the proceeds of joint effort, but as a dole fixed by the arbitrary will of the Employer or as a concession extorted by force. The Employer feels that each demand made upon him represents a raid upon his profits limited solely by the power of the Workers' organisations and unaffected by any consideration of the working expenses of the business, provision for depreciation or dilapidations, or the building up of a reserve against future depression.

- ✓ The problem is, therefore, to settle this question of *status* in some way which shall give the workman the sense of self-respect and responsibility which he desires, without interfering unduly with the employer's exercise of the necessary functions of management. The Trade Union regulations, which have been so largely suspended by agreement for the period of the war, were mostly directed towards this end—the assumption by Labour of some measure of control over the conditions under which it works. They refer to wages, hours of labour, overtime and Sunday work, apprenticeship and the method of entry into particular occupations, the kind of work to be performed by different classes of workers, the methods of negotiation between Employers and Employed and similar questions. In other words, they represent an attempt to substitute for the autocratic control of the employer over the working lives of his employees a greater and greater degree of self-direction by the organised workers themselves, acting through their accredited representatives.

✓ As a natural result of the assumed conflict between the fundamental interests of Employers and Employed, the action of the Trade Unions took the form, in appearance at least, of an attack upon the profits of the Employers and their right to control the conduct of their business. It was largely as a defence against the Unions that the great Employers' Associations came into being. After making all allowance for the occasional insubordination of Trade Union members and the lack of support given in some quarters to the Employers' Federations, the effect of these parallel organisations has been beneficial to both sides. Hitherto, however, the action of both groups has been almost entirely negative. They have placed restraints both upon tyranny and upon anarchy; they have succeeded in compromising many disputes and in restricting the occasions of open conflict; but they have done little or nothing to remove the continual undercurrent of latent hostility and divergence of effort which has hampered industrial development far more than the direct effect of strikes and lock-outs. They have protected the special interests which they respectively represent; but they have not risen to the conception of combined action in pursuit of their common interests. Valuable as their work has been, it can hardly be regarded as an adequate return for the ability, energy and power of organisation displayed on both sides.

✓ The explanation of the comparative failure of the Employers' Associations and Trade Unions on the constructive side of the industrial problem is to be found in their strictly sectional and defensive origin and outlook. Regarding themselves as entrusted with the interests of one party to Industry and not of Industry itself, they have paid no attention to the problems and difficulties of the other side, and they have come together only when one had a demand to make of the other or when a conflict was imminent. Thus they have always met in an atmosphere of antagonism, and their negotiations have been

Garton
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carried on as between two hostile bodies. Exchange of views has come at too late a stage in the proceedings, when a stand has already been taken on both sides and prestige or prejudice forms an obstacle to concessions. What is still more important, their discussions have been confined to specific points of dispute and have not embraced the consideration of constructive measures for the improvement of industrial conditions and the increase of efficiency. Yet the possibilities of combined action which lie in these two great groups of highly organised and powerful bodies might transform the whole face of industrial life. Their united knowledge of both sides of the industrial process should enable them to throw light on every phase of its successive developments. Their united strength would render them, in combination, practically irresistible. But to secure the realisation of these possibilities the co-operation between the two groups must be continuous and constructive, and must be based upon a recognition of the common interests of Employers and Employed, both as parties to industry and members of the community. Employers must realise that both their own interests and the obligations of citizenship impose upon them the necessity of a sympathetic understanding of the lives and standpoint of those with whom they work and a willingness to co-operate, without dictation and patronage, in every endeavour to improve their material or social conditions. Labour must realise its direct interest in the improvement of industrial processes, the organisation of industry, the standard and quantity of production and the elimination of waste in material or effort.

* * * * *

The machinery necessary for such co-operation will require to be created.

PROPOSED WORKS COMMITTEES.

✓ In its simplest form, the new machinery would consist of Joint Committees, representing both the Management and the Works Staff. This method would lend itself readily to experiment by individual firms, and could be applied even in the unorganised trades where no strong Trade Unions or Federations of Employers exist. At the meetings of such Committees any questions affecting working methods and conditions could be brought up for discussion by either side. The representatives of Management would be required to explain the nature and extent of any proposed innovation designed to increase output or economise effort— the introduction of new automatic machinery, time and motion study, standardisation of tools, analysis of fatigue, elimination of waste—and its effect upon the earnings of the firm and of the individual worker. This explanation should be as clear and full as possible with the object of giving each worker an interest and sense of responsibility in his work, by making clear to him, through his representatives, the *reason* for the methods to be adopted and the relation of his job to the whole process of production. The proposals having been explained, the Workers' representatives would consider them from the point of view of the interests of the men employed, the relation between the different classes of labour, the strain on the workers, the amount of interest and intelligence put into their work. If necessary, they would put forward modifications or safeguards for the protection of these interests. Where the result was to show a real divergence of opinion or of interest, it would be freely discussed, with a view to finding a way round and adjusting the balance between common and competing interests. In like manner, proposals for alterations in the hours or conditions of labour, in the interests of the health or social welfare of the workers, would be put forward by the Workers' representatives and discussed in the light of any objections on the score of expense or difficulties of working urged by the Representatives of Management. While the Representatives of Management would naturally be concerned mainly with the efficiency of the business and those of Labour with the immediate interests of the Workers, it is very desirable that neither should confine their attention to their own side of the business.

PROPOSED INDUSTRIAL COUNCILS.

✓ In the staple trades, the method of Works Committees would require to be replaced, or supplemented by Joint Boards composed of representatives of the Employers' Associations and the Trade Unions.

Two co-equal Boards might be created in each industry, one representing Management and the other Labour, with a Supreme Board of Control co-ordinating the work of both. Garton
Memorandum.

In its most ambitious form, the Supreme Board of Control would resolve itself into a National Industrial Council for each of the staple industries or groups of allied industries.

The field of action open to the Industrial Councils would be very great. It would extend for instance, to

- (a) the suggestion and consideration of improved methods and organisation ;
- (b) the maintenance of works discipline and output ;
- (c) the maintenance of a high standard of design and workmanship ;
- (d) the education and training of apprentices, and the conditions of entry into the industry concerned ;
- (e) the demarcation of tasks ;
- (f) the prevention of unemployment, the development of security of tenure in the trade and the decasualisation of labour ;
- (g) questions of wages and piece rates ,
- (h) the prosecution of research and experiment, and
- (i) the improving of the public status of the industry.

At the outset it might often happen that much of the discussion either in a Works Committee, or a National Industrial Council, was obstructive or irrelevant. But it has been proved again and again that contact breeds mutual understanding and responsibility calls forth capacity. Without depreciating the part which may be played by Government and by independent experts in the regulation and encouragement of industry, the primary essential of progress is that Industry shall have faith in itself.

Whatever form the new developments may take, the essential preliminary is the adoption of a new attitude with regard to Industry, the recognition of national responsibility for industrial conditions, the recognition of the joint responsibility towards the nation borne by those who are engaged, whether as Employers or Employed, in its activities. To hold the balance true between the economic and the human side of the problem ; to increase at once the extent and quality of output ; to make the work of each man, in any position, an integral and worthy part of his life as a citizen ; this is a task as truly national as that of victory in war. The unparalleled and undreamt-of expansion of our military strength which has been called forth by the European struggle, may give us the measure of our capacity to meet the requirements of peace.

WORKS LECTURES.

p. 24.
p. 209.

A large firm of manufacturers in the North of England has recently adopted with every success the following scheme for creating a better understanding between the principals and the employees, and for promoting the efficiency of the business. An outside person, who has given much thought to industrial and commercial matters, was requested by the firm to come and study the business in all its bearings and phases, in order to deliver lectures to the workpeople, the staff and also the employers themselves, with a view of making plain to each the nature of the business, the principles of industrial efficiency, and the true nature of industrial relations. He was given every opportunity of acquainting himself with the business side of the concern, the buying of the raw material, the administration of the offices and works, the finances of the firm and the sale of the finished product, and was also given every facility for familiarising himself with the lives, working conditions, thoughts and aspirations of the workers. In the first place arrangements were made for a course of twelve lectures to the management and staff. The benefits of these were so marked that a further course of twelve lectures was arranged to be given to selected representatives of the workpeople. The lectures were given on one afternoon, for twelve successive weeks, and were attended by several hundred employees who were paid their wages for the time of attendance, the lectures being regarded as a part of the working routine. The

Garton
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andum.

lecturer was left an entirely free hand as to what he should say, and did in fact administer praise or blame impartially upon the results of his investigation. The improvement in the relations between the firm and its employees surpassed all expectations, and the scheme is to be established as a permanent feature of the organisation of the business. Many employers who have been aroused during the war to a quickened consciousness of their responsibility and who desire to establish for the future a new spirit in their works, have asked themselves, "What can we do to-morrow?" The above scheme is suggested as an answer to that question.

Whitley
Report.

REPORT ON JOINT STANDING INDUSTRIAL COUNCILS¹

(RECONSTRUCTION COMMITTEE)

SUB-COMMITTEE ON RELATIONS BETWEEN EMPLOYERS AND EMPLOYED

THE RT. HON. J. H. WHITLEY, M.P., CHAIRMAN

MARCH, 1917

The circumstances of the present time are admitted on all sides to offer a great opportunity for securing a permanent improvement in the relations between employers and employed, while failure to utilise the opportunity may involve the nation in grave industrial difficulties at the end of the war.

In the interests of the community it is vital that after the war the co-operation of all classes, established during the war, should continue, and more especially with regard to the relations between employers and employed. For securing improvement in the latter, it is essential that any proposals put forward should offer to workpeople the means of attaining improved conditions of employment and a higher standard of comfort generally, and involve the enlistment of their active and continuous co-operation in the promotion of industry.

Many complicated problems have arisen during the war which have a bearing both on employers and workpeople, and may affect the relations between them. It is clear that industrial conditions will need careful handling if grave difficulties and strained relations are to be avoided after the war has ended. The precise nature of the problems to be faced naturally varies from industry to industry, and even from branch to branch within the same industry. Their treatment consequently will need an intimate knowledge of the facts and circumstances of each trade, and such knowledge is to be found only among those directly connected with the trade.

We recommend that His Majesty's Government should propose without delay to the various associations of employers and employed the formation of Joint Standing Industrial Councils in the several industries, where they do not already exist, composed of representatives of employers and employed, regard being paid to the various sections of the industry and the various classes of labour engaged.

In the well-organised industries, one of the first questions to be considered should be the establishment of local and works organisations to supplement and make more effective the work of the central bodies. It is not enough to secure co-operation at the centre between the national organisations; it is equally necessary to enlist the activity and support of employers and employed in the districts and in individual establishments. The National Industrial Council should not be regarded as complete in itself; what is needed is a triple organisation—in the workshops, the districts, and nationally. Moreover, it is essential that the organisation at each of these three stages should proceed on a common principle, and that the greatest measure of common action between them should be secured.

With this end in view, we are of opinion that the following proposals should be laid before the National Industrial Councils:

- (a) That District Councils, representative of the Trade Unions and of the Employers' Association in the industry, should be created, or developed out of the existing machinery for negotiation in the various trades.
- (b) That Works Committees, representative of the management and of the workers employed, should be instituted in particular works to act in close co-operation with the district and national machinery.

As it is of the highest importance that the scheme making provision for these Committees should be such as to secure the support of the Trade Unions and Employers' Associations concerned, its design should be a matter for agreement between these organisations.

¹ Extracts, by permission, from Reports [Cd. 8606 and 9002], published by H.M. Stationery Office.

The respective functions of Works Committees, District Councils, and National Councils **Whitley Report.** will no doubt require to be determined separately in accordance with the varying conditions of different industries. Care will need to be taken in each case to delimit accurately their respective functions, in order to avoid overlapping and resulting friction. For instance, where conditions of employment are determined by national agreements, the District Councils of Works Committees should not be allowed to contract out of conditions so laid down, nor, where conditions are determined by local agreements, should such power be allowed to Works Committees.

Among the questions with which it is suggested that the National Councils should deal or allocate to District Councils or Works Committees the following may be selected for special mention:

- (i) The better utilisation of the practical knowledge and experience of the workpeople.
- (ii) Means for securing to the workpeople a greater share in and responsibility for the determination and observance of the conditions under which their work is carried on.
- (iii) The settlement of the general principles governing the conditions of employment, including the methods of fixing, paying, and readjusting wages, having regard to the need for securing to the workpeople a share in the increased prosperity of the industry.
- (iv) The establishment of regular methods of negotiation for issues arising between employers and workpeople, with a view both to the prevention of differences, and to their better adjustment when they appear.
- (v) Means of ensuring to the workpeople the greatest possible security of earnings and employment, without undue restriction upon change of occupation or employer.
- (vi) Methods of fixing and adjusting earnings, piecework prices, etc., and of dealing with the many difficulties which arise with regard to the method and amount of payment apart from the fixing of general standard rates, which are already covered by paragraph (iii).
- (vii) Technical education and training.
- (viii) Industrial research and the full utilisation of its results.
- (ix) The provision of facilities for the full consideration and utilisation of inventions and improvement designed by workpeople, and for the adequate safeguarding of the rights of the designers of such improvements.
- (x) Improvements of processes, machinery and organisation and appropriate questions relating to management and the examination of industrial experiments, with special reference to co-operation in carrying new ideas into effect and full consideration of the workpeople's point of view in relation to them.
- (xi) Proposed legislation affecting the industry.

It appears to us that it may be desirable at some later stage for the State to give the sanction of law to agreements made by the Councils, but the initiative in this direction should come from the Councils themselves.

The plans sketched in the foregoing paragraphs are applicable in the form in which they are given only to industries in which there are responsible associations of employers and workpeople which can claim to be fairly representative.

It may be desirable to state here our considered opinion that an essential condition of securing a permanent improvement in the relations between employers and employed is that there should be adequate organisation on the part of both employers and workpeople. The proposals outlined for joint co-operation throughout the several industries depend for their ultimate success upon there being such organisation on both sides; and such organisation is necessary also to provide means whereby the arrangements and agreements made for the industry may be effectively carried out.

We are convinced, moreover, that a permanent improvement in the relations between employers and employed must be founded upon something other than a cash basis. What is wanted is that the workpeople should have a greater opportunity of participating in the discussion about and adjustment of those parts of industry by which they are most affected.

We venture to hope that representative men in each industry, with pride in their calling and care for its place as a contributor to the national well-being, will come together in the manner here suggested, and apply themselves to promoting industrial harmony and efficiency and removing the obstacles that have hitherto stood in the way.

SECOND REPORT ON JOINT STANDING INDUSTRIAL COUNCILS

October, 1917

It is difficult to classify industries according to the degree of organisation among employers and employed, but for convenience of consideration the industries of the country may be divided into three groups:

Group A.—Consisting of industries in which organisation on the part of employers and employed is sufficiently developed to render their respective associations representative of the great majority of those engaged in the industry. These are the industries which we had in mind in our first Interim Report.

Group B.—Comprising those industries in which, either as regards employers and employed, or both, the degree of organisation, though considerable, is less marked than in Group A.

Group C.—Consisting of industries in which organisation is so imperfect, either as regards employers or employed, or both, that no associations can be said adequately to represent those engaged in the industry.

The present Report is concerned with Groups B and C.

**Whitley
Report.**

It does not appear to us necessary or desirable to suggest any fixed standard of organisation which should exist in any industry before a National Industrial Council should be established. The case of each industry will need to be considered separately, regard being paid to its particular circumstances and characteristics.

In the discussion of this matter, we have considered whether it would be feasible to indicate a percentage of organisation which should be reached before a Council is formed, but, in view of the great diversity of circumstances in these industries and of the differing degrees to which the several sections of some of them are organised, we have come to the conclusion that it is more desirable to leave the matter to the decision of the Ministry of Labour and the organisations concerned. Whatever theoretical standard may be contemplated, we think its application should not be restrictive in either direction.

The level of organisation in industries in Group C is such as to make the scheme we have proposed for National or District Industrial Councils inapplicable. To these industries the machinery of the Trade Boards Act might well be applied, pending the development of such degree of organisation as would render feasible the establishment of a National Council or District Councils.

In order that the Trade Boards Act may be of greater utility in connection with unorganised and badly organised industries or sections of industries, we consider that certain modifications are needed to enlarge the functions of the Trade Boards. We suggest that they should be empowered to deal not only with minimum rates of wages but with hours of labour and questions cognate to wages and hours. We are of opinion also that the functions of the Trade Boards should be extended so as to enable them to initiate and conduct enquiries on all matters affecting the industry or the section of the industry concerned.

Most of the industries on Groups A and B have sections or areas in which the degree of organisation among the employers and employed falls much below what is normal in the rest of the industry, and it appears to us desirable that the general body of employers and employed in any industry should have some means whereby they may bring the whole of the trade up to the standard of minimum conditions which have been agreed upon by a substantial majority of the industry. We therefore recommend that, on the application of a National Industrial Council sufficiently representative of an industry, the Minister of Labour should be empowered, if satisfied that the case is a suitable one, to make an Order either instituting for a section of the industry a Trade Board on which the National Industrial Council should be represented, or constituting the Industrial Council a Trade Board under the provisions of the Trade Boards Act.

It may be useful to present a brief outline of the proposals which we have so far put forward :

- (a) In the more highly organised industries (Group A) we propose a triple organisation of national, district, and workshop bodies, as outlined in our first Report.
- (b) In industries where there are representative associations of employers and employed, which, however, do not possess the authority of those in Group A industries, we propose that the triple organisation should be modified by attaching to each National Industrial Council one or at most two representatives of the Ministry of Labour to act in an advisory capacity.
- (c) In industries in both Groups A and B, we propose that unorganised areas or branches of an industry should be provided, on the application of the National Industrial Council and with the approval of the Ministry of Labour, with Trade Boards for such areas or branches, the Trade Boards being linked with the Industrial Council.
- (d) In industries having no adequate organisation of employers or employed, we recommend that Trade Boards should be continued or established, and that these should, with the approval of the Ministry of Labour, be enabled to formulate a scheme for an Industrial Council, which might include in an advisory capacity the "appointed members" of the Trade Board.

**Industrial
Councils.**

In the "Whitley" Report proposals are made for meeting the case of the less fully organised trades, so that there are to-day three forms of industrial councils, if the term can be applied to all, viz. :

- (1) *Joint Industrial Councils* for fully organised trades.
- (2) *Interim Industrial Reconstruction Committees*—for less fully organised trades.
- (3) *Trade Boards*—under the Trade Boards Act 1918—for relatively unorganised trades.

It is of great interest to note the progress that has been made in this direction and the following list gives various industries in which one or other form of industrial council has been established.

Joint Industrial Councils.

Asbestos manufacturing.
 Bread baking and flour confectionery.
 Bedstead (Metallic).
 Bobbin and shuttle making.
 Boot and shoe manufacturing.
 Building.
 Carpet.
 Chemical (Heavy).
 China Clay.
 Coir Mat and matting.
 Elastic web, cord and braid small wares fabric.
 Electrical Contracting.
 Electricity Supply.
 Flour Milling.
 Furniture.
 Gas.
 Gold, silver, horological and allied trades.
 Heating and domestic engineering.
 Hosiery.
 Leather Goods (made up).
 Local Authorities non-trading services (manual workers).
 Match Manufacturing.
 Music Trade.
 Needle, Fish hook, Fishing Tackle and Allied Trades.
 Packing case making.
 Paint, colour and varnish.
 Plate and sheet (Welsh).
 Pottery.
 Printing and Allied trades.
 Road Transport.
 Rubber manufacturing.
 Sawmilling.
 Silk.
 Spelter trade.
 Tin Mining.
 Vehicle building.
 Wall Paper making.
 Waterworks undertakings.
 Wire manufacturing (iron and steel).
 Wool and allied textiles.

Interim Industrial Reconstruction Committees.

Artificial Stone.
 Basket making.
 Blacksmiths and Farriers.
 Brush making.
 Clay.
 Cocoa, Chocolate, Sugar, Confectionery and Jam.
 Cooperage.
 Cutlery.
 Envelopes and manufactured stationery.
 Fertilisers.
 Furniture warehousing and removing.
 Gas mantle.
 Glass.
 Glove.
 Lead manufacture.
 Non-ferrous mines.
 Optical instruments.
 Paper making.
 Patent fuel.
 Polish (boot and floor).
 Quarrying.
 Railway Carriage and wagon building.
 Safe, Lock, and Latch.
 Sugar refining.
 Textiles (making up and packing).

Industrial Councils.*Trade Boards.*

Boot and shoe repairing.
 Brush and broom.
 Chain.
 Hollow-ware.
 Lace finishing.
 Laundry.
 Linen and Cotton embroidery.
 Paper Box.
 Shirt making.
 Sugar confectionery and food preserving.
 Tailoring.
 Tin Box.
 Tobacco.

Of the above, the Pottery Industry was the first to set up an Industrial Council¹ and this fact adds interest to the following extract, given by permission of the Council, from their constitution.

National Council of the Pottery Industry

OBJECTS.

The advancement of the Pottery Industry and of all connected with it by the association in its government of all engaged in the industry.

It will be open to the Council to take any action that falls within the scope of its general object. Its chief work will, however, fall under the following heads:

- (a) The consideration of means whereby all Manufacturers and Operatives shall be brought within their respective associations.
- (b) Regular consideration of wages, piecework prices, and conditions, with a view to establishing and maintaining equitable conditions throughout the industry.
- (c) To assist the respective Associations in the maintenance of such selling prices as will afford a reasonable remuneration to both employers and employed.
- (d) The consideration and settlement of all disputes between different parties in the industry which it may not have been possible to settle by the existing machinery, and the establishment of machinery for dealing with disputes where adequate machinery does not exist.

¹ First Meeting of Council, 11th June, 1918.

**Industrial
Councils.**

- (e) The regularisation of production and employment as a means of insuring to the workpeople the greatest possible security of earnings.
- (f) Improvement in conditions with a view to removing all danger to health in the industry.
- (g) The study of processes, the encouragement of research, and the full utilization of their results.
- (h) The provision of facilities for the full consideration and utilization of inventions and improvements designed by workpeople and for the adequate safeguarding of the rights of the designers of such improvements.
- (i) Education in all its branches for the industry.
- (j) The collection of full statistics on wages, making and selling prices, and average percentage of profits on turnover, and on materials, markets, costs, etc., and the study and promotion of scientific and practical systems of costing to this end.
All statistics shall, where necessary, be verified by Chartered Accountants, who shall make a statutory declaration as to secrecy prior to any investigation, and no particulars of individual firms or operatives shall be disclosed to anyone.
- (k) Enquiries into problems of the industry, and, where desirable, the publication of reports.
- (l) Representation of the needs and opinions of the industry to Government authorities, central and local, and to the community generally.

The Building Trades, however, anticipated the findings of both the Garton Foundation and the Whitley Committee and independently formulated a Trade Parliament, which was inaugurated on May 29th, 1918.

**Works
Committees.**

While the adoption of Industrial Councils has become fairly widespread, the inauguration of works committees in conformity with the general scheme has not made equal headway. With employers' federations and trade unions already organised in the various trades, it was a relatively easy matter to form a Joint Council, but the formation of works committees meant a development of existing administrative organisation within each separate works. The initiative of such development rested with the individual employer; and membership of an employers' federation, for the protection of economic interests, was by no means synonymous with any high standard of internal organisation. In fact the decision of any employers' federation to take part on a Joint Industrial Council with the trade unions concerned does not necessarily connote a willingness on the part of each employer member to establish that contact with the workers that a works committee involves and from which it should derive its greatest value.

This loss of personal contact between employers and employed, arising out of the development of industry and consequent increase in size of industrial units, is the root cause of much of the estrangement that exists. Herein lies also the great opportunity of management to be recognised as being not only the steward of capital but also the administrator of labour—the medium by which the

potentialities of capital are made fruitful to all parties through the instrument of labour. **Works Committees.**

If management as a profession reached a high enough standard, labour would have nothing to gain by the elimination of capital—in the sense contemplated by the extremists in the labour political camp.

This wider reference bears on the question of works committees, as mainly through that channel the works manager can establish the intimacy, with the whole body of workers under him, necessary to ensure a clear understanding as to the necessities of both sides, as to what really constitutes the common interests of employers and employed.

For the works manager to be a propagandist of economics to the extent requisite for holding the balance fairly as between Capital and Labour is to suggest a diversion of his activities that might be fatal to his technical efficiency. On the other hand, works managers ought to be so trained in their work as administrators as to get better results than many of them do to-day, and yet have time to spare. They ought, moreover, to be informed on these every day considerations of economics and civics as a matter of course. The obvious danger in these suggestions is that the development of the intellectual side might be at the expense of the technical side, in which, for every trade, there is so much to learn and for the most part only to be learnt by actual experience. These are among the many questions of management that have to be settled as the outcome of the recognition of management as a profession, with its philosophy, its art and its science.

Returning to the definite issue of works committees, a valuable report was issued in March 1918 by the Ministry of Labour reviewing the history and development of works committees, so far as their enquiries went. Extracts from this report (Industrial Report No. 2) are given by permission of H.M. Stationery Office on the following pages and their inclusion will obviate further general treatment here. The report itself should be in every works library.

Works Committees

Report of an Enquiry made by the Ministry of Labour

WORKS COMMITTEES BEFORE THE WAR

The extent of the existence of Works Committees before the war is largely a matter of definition. Our estimate of their scope will vary according as we give the term a wide interpretation, or confine it to committees representative of all the workpeople in an establishment. *Works Committees in this latter sense of the term existed before the war in various industries, and in some instances they had been in existence for many years. If the term is inter-

Works Committees.

puted in a wide sense, and taken to include various kinds of committees, such as those representative of individual trades or departments, or those which have come into existence at particular times and for limited purposes, the number in existence before the war is greatly increased. In certain industries, however, notably engineering, the conditions of war have produced such a change in both the form and function of workshop organisation, that the discussion of the general idea of Works Committees may be said to have developed out of those conditions.

The majority of Trade Unions have official shop stewards, though these officials may be known by some other name—such as “shop delegates,” “works representatives,” “collectors,” “yard committee-men.” In certain cases also the name committee—Watch or Vigilant Committee—is attached to the body of shop stewards in an establishment. It may even be said that the Works Committee is older than trade unionism; the “chapel,” for instance (the ancient organisation of the workmen in each printing office), goes back much further than the end of the seventeenth century.

Apart from (1) functions obviously intended to sustain the fabric of the Trade Union—the collection of dues, the interrogation of defaulters and newcomers, and the like—the duties of shop stewards are stated in the rules of different Unions to include (2) the regular supply to the branch or district committee of information respecting any encroachment upon recognised Trade Union conditions, participation in deputations to the management in connection with grievances, the calling of shop meetings of the members to discuss grievances, etc.

It remains true, of course, that the shop steward system up to the present has been in the main only a trade system, and that the committees formed under it can be classed under Works Committees only if the term is given the wide scope mentioned at the beginning of this report. If the term is used in this wider sense, committees will be found to have existed for many years in a number of industries where piecework is in operation.

The position of the “chapel” in relation to the London compositors’ scale is an old and well-established case of a works organisation taking part among other functions in the regulation of piecework.

The engineering trades have always resisted piecework; but, at the same time, they have generally bargained on an individual basis for any work done on this system. The extension of piecework and the growth of the method of collective bargaining in the shop—by Works Committees or stewards—have gone on side by side; and it would appear that, to a considerable degree, the one is the immediate cause of the other.

CONSTITUTION OF PRESENT-DAY COMMITTEES

It may be noted that in many cases Conciliation Boards are really Works Committees. This is so when the joint board is composed of representatives of the workpeople in one establishment and of members of the firm. Such boards—with varying degrees of connection between the workmen’s side and the Trade Unions—have been formed in individual establishments belonging to a variety of industries.

As a rule, Works Committees appear to be committees of the workers only, with regular facilities for consultation with the management, either at fixed intervals or whenever occasion arises.

Two main methods appear to prevail in regard to the composition of a Works Committee of the type mentioned above.

(a) The committee may be elected by all the workmen employed, each department or shop being treated as a constituency, and returning a number of members, perhaps in proportion to its size. This appears to be the simplest method and is found even in works in which the workers have already an industrial organisation in the shape of shop stewards or delegates.

This method of departmental election commonly results in a committee, all the members of which are shop stewards. But even when this is so, a majority of the shop stewards may not be on the committee; and the members may be drawn from a minority of the Unions.

(b) The committee may be a committee of the shop stewards of the different Unions represented in the works, or, in a large works where shop stewards are numerous, a committee elected by the shop stewards.

In one works with 4000 workmen the Works Committee of 21 members, **Works** elected by a general vote of the men workers, is entirely composed of shop **Committees**, stewards. In another works, with 3500 workmen, in which a Works Committee has existed for about ten years, all the workmen in any department may vote, but only unionist workmen can be elected, and half of the members of the Works Committee are shop stewards.

In some works there is one committee for skilled men and another for unskilled or semi-skilled. In several large engineering establishments, for instance, there are two Committees of Shop Stewards, one for craftsmen, and another for semi-skilled men and labourers. Generally, however, there is only one committee for both sets of workmen.

PROCEDURE.

In the matter of procedure in the stricter sense of the term there is at present a good deal of variety. Generally the procedure is somewhat informal, and this, in the earlier stages of a Works Committee, is perhaps to the good. The normal procedure, so far as one can speak of a normal procedure, is somewhat as follows.

- (1) A workman who has a grievance will report it, directly or through the committee-man in his department, to the secretary. Lesser grievances, which do not affect a number of men or raise a general question, may be settled at once by the secretary with the foreman or departmental manager concerned.
- (2) Grievances which are not thus settled are taken up by the Committee, and brought by the committee before the management.
- (3) If grievances or disputes are not settled with the management, they are carried to the branch or the district organisation of the Trade Union or Trade Unions concerned, and they go henceforth along the ordinary channels of Trade Union organisation.

Another matter of procedure is one which touches the management and directors of a firm. It is important that the representatives of the firm, who meet the committee, or (if it is a joint body) sit on the committee, should belong to the highest rank.

A particularly interesting development during the war has been the appointment to the management staffs of several establishments of persons whose chief function is to deal with labour questions. The success of a Works Committee may to a considerable extent depend upon the status and qualifications of such an official.

FUNCTIONS.

It would appear that the functions of a Works Committee are practically always consultative. Usually a Works Committee can bring matters before the management and discuss them with the management; it can press its views about these matters on the management; in the last resort, it can induce the Trade Union organisation to call a strike. But the Works Committee cannot usually, as such, carry its views into action, or ensure that they shall be carried into action, by any direct machinery. The management has the executive power, and unless the management is impressed by the representations of the members of the committee, or by the sanction which lies behind them, those representations will not lead to executive action. This would appear to be usual even where the Works Committee is a Joint Committee.

It would appear that a Works Committee, if it is to be of any value in ventilating and removing grievances, must be in a position to ventilate grievances arising from the conduct of foremen or overlookers. Such grievances touch the worker most closely in his daily work, and if they cannot be discussed the committee loses a sphere of action in which it might be of the greatest service. It is true that if a committee has the right of criticising the action of foremen, difficulties may arise. Foremen may feel that their authority is undermined; they may feel that they are being made responsible not only, as heretofore, to the management (a responsibility they know and understand), but also to the committee; they may feel that, with a dual responsibility, their position becomes exceedingly difficult. These are real

**Works
Committees.**

problems. In many instances, however, they seem to have been surmounted; and if they prove serious, they may perhaps be met, to some extent, if the general manager arranges to meet the foremen in advance, and to discuss with them criticisms and grievances which have come from the Works Committee.

A Works Committee must stand in some sort of relation to the district committees of the Unions to which the workmen in the works belong, and some demarcation of functions, whether explicit or implicit, has to be made. Generally the division is said to be that questions of general application—district rates of wages, hours of work, and other district or national conditions of work—are regarded by Works Committees as outside their sphere, and such questions are left to be settled by the employers or associations of employers with the Trade Unions.

This does not mean that the Works Committee may not consider an alleged infringement of such conditions. This, as we saw previously, is one of the usual duties of shop stewards.

On the other hand, questions of a particular application relating to a works—for example, a piece-rate for a particular job for which it is impossible to lay down any general piece-rate for the district—are regarded as belonging to the functions of a Works Committee. Such a committee may thus deal (1) with the particular application in the works of a principle general to the district, and (2) with questions which are entirely peculiar to the works.

The powers of the management and the powers of the local Trade Union organisation may be said to constitute two points more or less fixed, and the powers of a Works Committee are naturally determined with reference to those two points in ways that vary according as those points vary.

Turning to the Works Committee in itself, we may distinguish two main types of function. In the first type a committee is primarily concerned with some one particular thing—a scheme of dilution, a system of bonus, or a method of profit-sharing. This does not prevent such a committee from dealing incidentally with other things.

In the second type a committee is from the first general in its range, and is formed to deal with the general industrial conditions of a works. One such committee has for its province (1) to enquire into grievances reported by workmen; (2) to bring before and discuss with the management grievances that it considers genuine; (3) to consider complaints about wages and piece-rates which concern individuals; (4) to consider questions relating to the health and safety of the workmen; (5) to consult with the management on the interpretation of awards, orders and circulars; and (6) to consider generally the conditions of work in the establishment. This may be considered to be fairly typical. Another committee, primarily concerned with piece-rates, has also dealt with questions of ventilation and sanitation, complaints about the decisions of foremen, arrangements of shifts and of hours of admission to the works, the allocation of piece-work and time-work, and the interpretation of official orders and circulars. Other matters handled by Works Committees include works discipline, especially timekeeping, methods of paying wages, hours of overtime, and the like.

Among the results expected from the giving of a larger measure of responsibility for industrial conditions to the workpeople is a considerable increase in efficiency. This is said to be possible if the ability of the workpeople to suggest improved processes and methods is properly used. The fact that the "suggestion box" is often stated to have proved a failure is not necessarily a condemnation of the idea; it may only mean that the somewhat mechanical and uninspiring device is in itself an inadequate stimulus. Where the management gains the confidence of the workpeople and has devised methods of considering suggestions which appeal to the workpeople, there is a much more powerful response than in works where, though there may be a suggestion box, these conditions are absent. Many employers and workpeople agree that a Works Committee may not only produce the atmosphere necessary to the stimulation of suggestions, but may also help to arrange for the proper investigation of proposals made by workpeople. In this connection, as in the quite different field of grievances, it would appear to be important that suggestions which look to be worthless should, nevertheless, be considered. The fundamental matter is that everyone should be encouraged to think about the processes and the organisation of the works.

It is doubtful whether a general Works Committee is a suitable body with which to discuss the value of a change in a particular process or machine, and the use of a small sub-committee for this purpose may be suggested. If the small committee thought the proposal sound, it would then go straight to the higher management.

GENERAL CONSIDERATIONS.

Probably the only generalisation one can safely make about the need for Works Committees in relation to the size of establishments is that the need increases with the size.

A Works Committee requires for its chairman or secretary—or, at any rate, one may say, ideally requires for its chairman or secretary—a man of personality, trusted by his fellow-workmen, respected by the management, with the spirit of service, and ready, in that spirit, to give his services freely in the cause of his committee. It requires no less a sympathetic and capable management, ready to listen, ready to weigh carefully, ready to take pains in discussion, and prepared to persuade and to be persuaded. It is one of the most encouraging signs of the times that on both sides such men have been found, and that, both among the management and the men, personalities have emerged to meet the needs of the institution.

Works Committees mean discussion; discussion takes time; and from this point of view it is sometimes argued that a Works Committee may tend to slow down the pace of industry, and, again, that it may be difficult to convince a committee of the value and the feasibility of a new idea or process, so that the way of innovation may be somewhat impeded. These, however, are theoretical objections. In practice Works Committees—the evidence would suggest—have improved timekeeping and increased output, and in that way they have accelerated rather than impeded the pace of industry. In practice, again, they have been the opposite of conservative, and instead of checking change they have themselves suggested change. And even if they made the pace slower, or change more difficult, they have advantages that would compensate, and more than compensate, for these defects. They make for better relations and greater harmony, and these are the things that matter most to industry. More time is gained by the absence of disputes than is lost by the presence of discussion; more improvements can be introduced in an atmosphere of harmony than can possibly be introduced in an atmosphere of suspicion.

In more than one works the summary of opinion on a Works Committee—and that not on one side only, but on both—has been expressed in the phrase, "This is the best thing that has ever happened in the shop." Such a summary could not be given if experience had not proved that a Works Committee was more than a piece of machinery and something different from the old methods of industrial consultation. It means that a Works Committee is felt to be something vital and something new—something that enlists the workers in real participation, and something that offers fresh promise for the future.

An agreement in the Engineering Trades relating to Shop Stewards Committees is given on page 207.

In the specimen set of works regulations given, there will be found on page 258 particulars of the constitution of what is called a *Works Co-ordination Committee*. This reflects a very successful experience in establishing a proper spirit of co-ordination amongst several thousand workers.

It provides for a secret ballot on nominations duly announced and so long as the several shop representatives are duly elected by the majority of their fellows, the question of whether they are shop stewards of a trade union or whether they are trade unionists at all does not arise.

Works
Committees

Works
Co-ordination
Committee.
p. 15.

**Works
Co-ordination
Committee.**

The functions of such a committee will depend in some measure on the type of management, but primarily it provides a channel for free expression of thought and discussion on all questions pertaining to factory life.

Experience goes to show that there should be separate committees for (1) workers, (2) foremen, and (3) staff other than foremen.

When the workers' committee is associated with a labour co-ordination officer, discussed on the next page, as secretary, the possibilities for usefulness become greatly enlarged while minor matters do not require to await the meetings of the committee or take up its time.

The labour co-ordination officer is in a position to explain or to get explanation of any matter concerning which the committee have reason to be interested.

With the workers' committee meeting together in alternate weeks without the management being represented, discussion becomes the freer. If minutes are made of the points raised and the recommendations, if any, reached, the management can often act without a moment's delay and when the joint meeting is held, time can be more easily be found for some remarks by the management of interest to the workers' representatives.

The independent deliberation on various points by the committee in the first instance and by the management afterwards favours the exercise of better judgment and the growth of better understanding, which may be expected to lead to greater mutual respect.

Following the examination of the minutes by the management, if grounds can be found for posting a notice of any action taken for all the workers to read, the prestige of the works co-ordination committee can be greatly advanced and interest sustained by the works generally in their meetings.

In settling the form in which minutes shall be prepared, consideration may be given as to whether the names of the mover and seconder of the various recommendations shall appear. The point is one to be agreed with the committee in each case but there is something to be said for the omission of names—the more so if the practice is adopted of letting the foremen's committee see the minutes of the workers' committee. The same may be said as to the minutes of the foremen's committee when submitted to the management. Any step that lessens the liability of prejudice being incurred by activity on a committee is to be encouraged.

p. 77.

The provision of a club room for the workers' committee is reasonable in view of their responsibilities, and in particular it provides for interchange of views between the members necessary for their own guidance in putting forward their views at the committee meetings.

With committees of this character at work, proposals of a welfare character will be forthcoming from the right quarter—viz. from the beneficiaries without the stimulus of a welfare supervisor.

Works
Co-ordination
Committee.

The point that will strike some managements is that the power for good of these committees implies an equal power for evil. The answer to this is that management has got to face all the difficulties that free communication with the workers may entail, and must tackle them in the light of the greater knowledge a manager not only ought to have but ought to demonstrate that he has. The old time defence of ignoring what the workers thought will not serve any longer and those managers who feel diffident in entering into any argument must none the less find means to maintain their prestige with the workers, even if it means on occasion a frank acknowledgment of inability to reach a decision without obtaining expert assistance from outside or referring to some authoritative body.

In wages questions and matters relating thereto, individual employers, when members of an employers' federation, necessarily refer to that federation and to that extent the management is freed from discussing these issues with the workers. On the other hand, this shelving of responsibility on to the shoulders of an employers' federation can be carried too far and the personal standing of the management made to seem of little account in the eyes of the workers—in which event the value of personal contact may be seriously depreciated.

With the advent of Trade Industrial Councils on the one hand and Industrial Courts on the other, the recognition of external authority is placed on a different plane.

Reference to the employers' federation involves an *ex parte* decision, whereas on the Industrial Councils and in the Industrial Courts the workers are represented. The point of these remarks is that frankness is necessary to goodwill and the seeming to hide behind an employers' federation is a retrograde step.

Touching the new Industrial Courts, if all proposed actions could be discussed beforehand with a works co-ordination committee, a better spirit might be imported into the matter than was the case usually with the Munitions Tribunals.

p. 200.

Reference has already been made in connection with the subject of works co-ordination committees to the plan of associating the labour co-ordination officer with these committees as secretary. He can act for foremen's and staff committees equally with the workers' committees.

Labour
Co-ordination
Officer.

p. 248.

p. 338.

p. 344.

The suggested title is a new one and is something more than an alternative to the "welfare worker"—as developed in women's

Labour
Co-ordination
Officer.

p. 245.

industries during the war—or of the employment officer—also a war growth in men's industries.

The L.C.O., to give him a short title, does not go round looking for good deeds to do, in the "welfare" sense. Through a works co-ordination committee the intelligence of the workers themselves is made available to deal with nearly everything a welfare worker is expected to do amongst women. In any case men workers do not take kindly to the idea of someone being appointed to look down, metaphorically, on their troubles and discomforts and tell them what they need. For juniors, the case is quite different and the idea of an adult looking after a junior's welfare does not imply the least loss of self-respect or dignity on either side and it is a duty in the works nearly parallel to that in the civic community.

p. 240.

In the case of apprentices, the technical qualifications necessary for their full development favours the appointment of a craftsman instructor—in large works one of the management staff may act as apprentice supervisor with a whole time instructor under his direction. This is work which is outside the field of a labour co-ordination officer as such.

p. 259.

p. 269.

There are social aspects of employment in which it is a great help for some official of the firm to have time to assist in the organisation of recreation, thrift and education—though the workers themselves should be encouraged to meet their own needs and in this direction a works co-ordination committee can usefully extend its operations by means of auxiliary committees. For this official to be wholly on such work is not usually necessary but with any considerable number of juniors employed the conditions may easily entail that. The L.C.O. may or may not be used for this class of work but it takes him into a field rather outside the conception that is recommended.

The L.C.O. should be a definite link in labour administration and have prestige accordingly.

He should interview new comers to explain the works regulations and establish touch with each worker on behalf of the management. This does not mean that he should have any executive authority as to engagement of labour—his impartiality afterwards may seem in question if he does. None the less, he can amongst other things assist the management in regard to the new problem of employing disabled men.

A not inapt alternative title for the L.C.O. would be that of "explanation" officer. His duty covers being in attendance at his office at the works meal times for dealing with any difficulties individual workers may have—queries, it may be, which have not been satisfactorily answered by the ordinary officials.

The L.C.O. provides a channel for smoothing out difficulties whether fancied or real and the fact that the L.C.O. can go direct to the management to state a case gives him a status quite sufficient for his work. Obviously he must be a man of high integrity and the very antithesis of a tale bearer, else his work will undermine the discipline of the works. His fairness of view and care in investigation must be unquestionable and, under such conditions, he should obtain the respect of the foremen, who must always be the key to works efficiency.

Friction between a worker and his foreman is likely to resolve itself into dismissal. The L.C.O. by his explanatory power may obviate this development with its consequent reaction on other workers without, in the least, vitiating the foreman's authority.

The L.C.O. can with advantage be a centralising point or clearing house for labour employment matters, such as :

Additional labour required.

Transfers.

Notice of suspensions.

Leave of absence.

Discharges.

Notices to leave.

These functions are indicated on the specimen labour notification form.

He can in the exercise of these functions take charge of the works enquiry office—as outlined on page 239—its work of recording particulars of applicants for employment and other routine pertaining to employment records.

In the design for a labour administration building shown in diagram form on page 76, the L.C.O.'s office is shown near the works enquiry office with waiting room and interview room adjoining.

Labour
Co-ordination
Officer.

III B

GOVERNMENT REGULATIONS

**Law and
Industry.**

THE relation of law to industry is a wide subject and touches many very diverse aspects. It is not proposed to attempt any full survey in this work of what is involved, and the particular purpose of this section is to bring under notice certain Acts of Parliament which have an intimate relation to labour administration and therefore should be clearly appreciated by those responsible for management.

References are, however, made elsewhere to certain phases of commercial law, viz. :

Prevention of Corruption Act, p. 283.
Sale of Goods Act, p. 284.
Shops Act, p. 322.
Patents and Designs' Act, p. 319.
Design Rules, p. 320.

The National Insurance Acts 1911 and 1918 pertain directly to labour but the reference necessary thereto is given on page 367. Further, the new Education Act 1919 is referred to under Social Aspects of Employment, on page 272.

In the pages immediately following, reference is made to the following Acts :—

Factory Acts.
Truck Acts.
Employers' Liability Acts.
Industrial Courts Act.

Factory Acts.
p. 223.

Factory legislation dates from 1802, and the results of a hundred years' legislation were consolidated and developed in the Factory and Workshop Act 1901. In view of the great length of this Act, it is convenient to quote from the abstract prepared by the Home Office which has to be posted at the entrance of every factory and workshop for the information of the workers as to their rights and privileges under the Act. It is not, however, necessary to reproduce the whole of the abstract but on the other hand it is useful to elaborate a little what appears there and slightly rearrange the matter.

The part of the abstract dealing with hours of work for women **Factory Acts.** and young persons is omitted as of small interest in view of the all round shortening of hours and the elimination of half-time under the new Education Act. The regulations of moment under this head may be summed up, for the present purposes, as follows:—

that women, young persons [under 18] and children [under 14]

- (1) may only work within an agreed range of twelve hours—not earlier than 6 a.m. and not later than 8 p.m.,
- (2) may not have a longer interval between meals than five hours,
- (3) may not work overtime or on Sundays.

The Factory Acts of 1901 and 1911 were extended by the Police, Factories, &c. (Miscellaneous Provisions) Act 1916 and extracts are accordingly given, page 197. For the first time, the term welfare is brought in. Seeing that the occasion for its use includes such matters as

p. 269.

Arrangements for preparing or heating and taking meals.

Supply of drinking water.

Supply of protective clothing.

Ambulance and first aid arrangements.

Supply and use of seats in workroom, etc.

it is difficult to follow why regulations relative to these matters are designated welfare orders, any more than the larger issues arising of the Factory Act generally—surely the far reaching provisions for hygiene, safety, hours of work and holidays for women and young persons, etc., are as much aimed at the welfare of the workers as the so-called "welfare" regulations.

It will be noted that the law now makes it possible for the Home Office to issue Statutory Orders relative to arrangements for supervision of workers, though no such order has been issued yet. It is to be supposed that this is aimed at providing employment, through State interference, for the "welfare worker." Such a course is not consonant with the dignity and self-respect of either the worker or the management. On the other hand, there is tremendous room for improvement in labour administration and working conditions generally, hence the prominence afforded to the question in this book.

p. 245.

Notes on the Factory Acts, based on Official Abstract.¹

HYGIENE.

Cleanliness.—The factory must be kept in a cleanly state and free from effluvia. All inside walls of rooms, all ceilings and tops of rooms, and all passages and staircases, must either (a) be limewashed every 14 months;

¹ By permission of The Controller of H.M. Stationery Office.

Factory Acts. or (b) be painted with oil or varnished every seven years, and washed with hot water and soap every 14 months. Particulars of the limewashing, &c., must be entered in the General Register.

p. 73.

p. 80.

p. 226.

Air space.—The factory must not be overcrowded. Subject to any Order that may be made by the Secretary of State, there must be in each room at least 250 cubic feet of space for each person employed during the fixed period of employment; and 400 cubic feet during overtime. The number of persons that may legally be employed in each room must be entered in the Notice prescribed to be posted in the Factory.

Ventilation.—In every room in the factory sufficient means of ventilation must be provided and maintained for admission of fresh air and removal of impure air. Any standard of ventilation fixed by Order of the Secretary of State must be observed. In any case, the ventilation must be such as to render harmless, as far as practicable, any gas, vapour, dust, or other impurities that may be generated in the course of the work; and in cases where they are inhaled by the workers to an injurious extent, a fan or other means of a proper construction must be provided, maintained, and used, if so required by H M Inspector.

Temperature.—Adequate measures, of such a kind as not to interfere with the purity of the air, must be taken to secure and maintain a reasonable temperature in each room in which any person is employed. Where so required by Order of the Secretary of State, thermometers must be provided and kept in working order.

Wet processes.—Where wet processes are carried on, adequate means for draining the floor must be provided.

Poisonous substances.—Where lead, arsenic, or other poisonous substance is used, suitable washing conveniences must be provided. Where such poisonous substance is so used in any room as to give rise to dust or fumes, no person must remain in that room during meal times, and a suitable place for meals must be provided elsewhere in the factory for the use of persons employed in such room. White phosphorus must not be used in the manufacture of lucifer matches.

Prohibition of employment.—A child must not be employed in a room in which is carried on (a) mercurial silvering of mirrors or white lead making, (b) melting or annealing of glass, (c)—as regards girls only) making or finishing of bricks and non-ornamental tiles, or making or finishing of salt; or (d) dry metal grinding, or dipping of lucifer matches. The prohibition under (a) extends to all persons under 18; under (b) to girls under 18; under (c) to girls under 16 (and in all parts of the works).

p. 257.

Prohibition of meals.—A woman, young person, or child must not take a meal, or remain during meal times, in a room in which is carried on mixing of materials in glass works, or grinding, cutting or polishing of flint glass, lucifer match making (except the process of wood cutting); sorting or dusting of wool or hair; sorting, dusting or grinding of rags; fur pulling; grinding, glazing or polishing on a wheel; brass casting; type founding; dipping metal in acid solutions; metal bronzing, cleaning and repairing cutgut; cutting, turning or polishing of bone, ivory, or shell; or manufacture of chemicals, or in the dipper's house, dipper's drying room, or china scouring room of a pottery. When dry powder or dust is used the prohibition extends to the making of white lead, playing cards, fancy boxes, almanacs, artificial flowers, or colours; lithographic printing, and paper staining, colouring and enamelling.

p. 81.

p. 263.

Sanitary accommodation.—Sufficient and suitable sanitary conveniences must be provided, with separate accommodation for each sex where persons of both sexes are employed. The standard of sufficiency and suitability fixed by Order of the Secretary of State must be observed in every factory in the District to which the Order applies.

The Sanitary Accommodation Order of 4th February, 1903, contains the following rule:

1. In factories or workshops where females are employed or in attendance there shall be one sanitary convenience for every 25 females.

In factories or workshops where males are employed or in attendance there shall be one sanitary convenience for every 25 males; provided that—

- (a) in factories or workshops where the number of males employed or in attendance exceeds 100, and sufficient urinal accommodation is also provided, it shall be sufficient if there is one sanitary convenience for every 25 males up to the first 100, and one for every 40 after;
- (b) in factories or workshops where the number of males employed or in attendance exceeds 500, and the District Inspector of Factories certifies in writing that by means of a check system, or otherwise, proper supervision and control in regard to the use of the conveniences are exercised by officers specially appointed for that purpose it shall be sufficient if one sanitary convenience is provided for every 60 males, in addition to sufficient urinal accommodation. Any certificate given by an Inspector shall be kept attached to the general register, and shall be liable at any time to be revoked by notice in writing from the Inspector.

In calculating the number of conveniences required by this order, any odd number of persons less than 25, 40, or 60, as the case may be shall be reckoned as 25, 40 or 60.

SAFETY.

p. 226.

Fencing—Every hoist or teagle, and every fly wheel directly connected with the steam or water or other mechanical power, whether in the engine-house or not, and every part of any water-wheel, or engine worked by any such power, must be securely fenced.

All parts of the mill-gearing and all dangerous parts of the machinery must either be securely fenced or be in such position or of such construction as to be equally safe to every person as they would be if securely fenced.

All fencing must be maintained in an efficient state

Cleaning machinery in motion—A child must not clean any part of the machinery in motion; or any place under moving machinery other than overhead mill-gearing.

A young person must not clean any dangerous part of the machinery in motion

A woman or young person must not clean any mill-gearing in motion.

Fire—Sufficient provision, to the satisfaction of the Local Authority, must be made for escape in case of fire; and maintained in good condition and free from obstruction

The doors must not be so locked or fastened that they cannot be easily and immediately opened from the inside. In every factory built after 1895, the doors (other than sliding doors) of every room in which more than ten persons are employed must open outwards.

Steam boilers—Every steam boiler must (a) be maintained in proper condition, and (b) have a proper safety valve, steam-gauge, and water-gauge, all maintained in proper condition, and (c) be thoroughly examined by a competent person every 14 months. A signed report (Form 55) of the result of the examination must be attached within 14 days to the General Register.

PIECEWORK PARTICULARS.

p. 211.

In certain classes of factories, every worker paid by the piece must have F 26 supplied to him such written particulars as will enable him to compute the amount of his wages, with such details as may be prescribed by Order of the Secretary of State. F 29. If a worker discloses such particulars for the purpose of divulging a trade secret he is liable to a penalty.

HOLIDAYS.

Women, young persons, and children must be allowed the following holidays :

ENGLAND AND WALES.—Christmas Day, Good Friday, and the four Bank Holidays. For these the Notice specified below is not required. For each of these holidays another holiday, or two half-holidays, may be substituted by the occupier by Notice.

SCOTLAND.—*In Burghs*. The two sacramental fast days, or, if these are discontinued, two days not less than three months apart, to be fixed by the Town Council; and, in addition, four holidays or eight half-holidays, fixed by the occupier by Notice.

Elsewhere—Two holidays, not less than three months apart, fixed by the occupier by Notice; and, in addition, four holidays or eight half-holidays, fixed by the occupier by Notice

Factory Acts. IRELAND.—(a) Christmas day; (b) any two of the following days fixed by the occupier by Notice—namely, 17th March (except when a Sunday), Good Friday, Easter Monday and Easter Tuesday; (c) three other holidays, or six half-holidays, fixed by the occupier by Notice.

Each half-holiday must comprise at least half of the period of employment for women and young persons on some day other than Saturday.

All Notices fixing holidays, or substituting one day for another, must be affixed in the factory and sent to H M. Inspector for the District in the first week in January (Form 34). The dates can afterwards be altered on a fortnight's notice given in the same way.

At least half of the holidays fixed by the occupier must be between 15th March and 1st October.

All women, young persons, and children employed in the factory must have the same days for holidays.

p. 340.

NOTICES, REGISTERS, RETURNS.

Occupation Notice.—The occupier must send Notice on Form 35 to the Inspector for the District within one month after beginning to occupy a factory, or changing his factory from one place to another, or converting a workshop into a factory by introducing power or otherwise.

Works Notices.—There shall be affixed at the entrance of every factory and workshop, and in such other parts thereof as an inspector for the time being directs; and be constantly kept so affixed in the prescribed form and in such position as to be easily read by the persons employed in the factory or workshop—

- (a) The prescribed abstract of this Act.
- (b) A notice of the name and address of the prescribed inspector.
- (c) A notice of the name and address of the certifying surgeon for the district.
- (d) A notice of the clock (if any) by which the period of employment and times for meals in the factory or workshop are regulated.
- (e) Every notice and document required by this Act to be affixed in the factory or workshop.

General Register.—In every factory and workshop there shall be kept a register, called the general register, (Form 37) showing the prescribed particulars as to—

1. Special Regulations and special exceptions in force.
2. Certificate from Local Authority as to means of escape in case of fire.
3. Young persons (under 18) employed—with certificates of fitness for those under 16.
4. Every accident occurring in the factory or workshop of which notice is required to be sent to an inspector.
5. Cases of poisoning.
6. Limewashing of the factory or workshop.
7. Employment of young persons and women before or after the usual hours.
8. Steam boiler examination.
9. Such other matters as may be prescribed. [Notably recording the regular tests of cranes and chains used for lifting.]

Return of Persons Employed.—The occupier must forward at such times and with such particulars as may be directed by the Secretary of State, a Return of the persons employed in the factory.

Accident Notices.—Notice on Form 43 must forthwith be sent to the Inspector for the District, and entry made in the General Register, when there occurs in the factory any accident causing to a person employed therein:—

- (a) Loss of life; or
- (b) Absence from his ordinary work for *at least one whole day*, the accident being due to machinery moved by mechanical power, molten metal, hot liquid, explosion, escape of gas or steam, or electricity; or
- (c) Absence from the ordinary work for *more than 7 days*.

If any accident as above occurs to a person employed who is not actually employed by the occupier, the actual employer must immediately report

the accident to the occupier. Where the death of an injured person occurs **Factory Acts.** after his disablement has been notified as above, the occupier must send to the inspector written notice of the death as soon as it comes to his knowledge.

Notice on Form 43 must forthwith be sent to the Inspector for the District, when there occurs the bursting of a revolving vessel, wheel, emery wheel, or grindstone moved by power, or the breaking of any appliance used for raising or lowering persons or goods with aid of power, or a fire affecting any room in which persons are employed and causing complete suspension of the ordinary work therein for not less than 24 hours, *whether such occurrence causes personal injury or not.*

Cases of anthrax, and of poisoning by lead, phosphorus, arsenic, or mercury, and of toxic jaundice (that is, jaundice due to tetrachlorethane or nitro- or amido- derivatives of benzene or other poisonous substance) must be reported on Form 40 to the Inspector for the District and to the Certifying Surgeon, and entered in the General Register

In the matter of the meaning of the expression, in clause (b) above, as to absence "for at least one whole day from his ordinary work," this has been laid down as meaning "one whole working day after that on which the accident occurred."

*Extracts from the Police, Factories, etc.
(Miscellaneous Provisions) Act, 1916.¹*

PART II. FACTORIES AND WORKSHOPS.

Where it appears to the Secretary of State that the conditions and circumstances of employment or the nature of the process carried on in any factory or workshop are such as to require special provision to be made at the factory or workshop for securing the welfare of the workers or any class of workers employed therein in relation to the matters to which this section applies, he may by Order require the occupier to make such reasonable provision therefor as may be specified in the order, and if the occupier fails to comply with the requirements of the order or any of them, the factory or workshop shall be deemed not to be kept in conformity with the Factory and Workshop Act, 1901

The following shall be the matters to which this section applies :—

Arrangements for preparing or heating, and taking, meals; the supply of drinking water; the supply of protective clothing, ambulance and first aid arrangements; the supply and use of seats in workrooms; facilities for washing; accommodation for clothing; arrangements for supervision of workers.

Orders may—

- (a) be made for a particular factory or workshop, or for factories or workshops of any class or group or description;
- (b) be made contingent in respect of particular requirements upon application being made by a specified number or proportion of the workers concerned, and may prescribe the manner in which the views of the workers are to be ascertained;
- (c) provide for the workers concerned being associated in the management of the arrangements, accommodation or other facilities for which provision is made, in any case where a portion of the cost is contributed by the workers; but no contribution shall be required from the workers in any factory or workshop, except for the purpose of providing additional or special benefits which, in the opinion of the Secretary of State, could not reasonably be required to be provided by the employer alone, and unless two-thirds at least of the workers affected in that factory or workshop, on their views being ascertained in the prescribed manner, assent.

¹ By permission of The Controller of H.M. Stationery Office.

Factory Acts. Save as otherwise expressly provided in the order, the occupier of a factory or workshop shall not make any deduction from the sum contracted to be paid by him to any workman or receive any payment from any workman in respect of any provision made in pursuance of an order under this section, and, if he makes any such deduction or receives any such payment, he shall be guilty of an offence against the Truck Act, 1831, and shall be liable to the penalties imposed by section nine of that Act as if the offence were an offence mentioned in that section.

* * * * *

This Part of this Act shall be construed as one with the Factory and Workshop Acts, 1901 to 1911.

Truck Acts The Factory Act Abstract to which reference has been made above includes a Note relative to the Truck Acts which is quoted below in full.

p. 247.
p. 360.

Note as to the Truck Acts.

The Truck Acts require that wages shall be paid in money only. Payment in goods or otherwise than in coin is illegal. This is subject to certain exceptions in regard to the supply of medicine, medical attendance, fuel, tools, rent, food cooked and eaten on the premises; provided a written contract is made and signed by the worker.

Any express or implied agreement as to the manner or place in which wages are to be spent (for the worker's private use) is illegal.

All fines and all deductions or charges in respect of bad work, injury to the property of the employer, or the use or supply of materials, tools, &c., are illegal unless made in pursuance of a contract between the employer and the worker. The contract must be in writing and signed by each worker, or else contained in a notice affixed in the works; and a copy must be given to each worker when the contract is made.

In the case of fines, the contract must specify clearly the matter in respect of which a fine may be imposed, and the amount of the fine.

In the case of materials, tools, &c., the charge must in no case exceed the cost thereof to the employer.

No fine or deduction or charge (nor any contract respecting the same) is legal unless it is fair and reasonable.

Written particulars must be given to the worker on each occasion when a fine or deduction or charge is made.

A register of all fines imposed must be kept. The contract and register must be produced on demand of H.M. Inspectors.

A copy of the contract, or of the notice containing its terms, must be given to any worker on demand.

A breach of the Truck Acts not merely entitles the worker to recover the fine or deduction or the wages paid in goods, but is also punishable by penalty on summary conviction.

The use of fines as a means of discipline is resented by the workers and does not appeal to enlightened managers. Where, however, any system of fines is in operation due regard must be paid to giving the worker written particulars when such a deduction is made from his wages and a register kept of all fines imposed.

**Home Office
Reports.**

It may be pointed out here that the Annual Report of the Chief Inspector of Factories and Workshops for 1918 contains, amongst other valuable matter, a report on Hours of Work, of which extracts are given on page 219. Other extracts from the same report are

given, viz. accident prevention, on page 226, and continuation classes on page 269, though these extracts in no sense cover the range of the report as a whole.

These annual reports constitute a mine of information on labour administration and each year's report should be obtained and after being suitably bound held as an authoritative work of reference in every works' library. There are other publications of the Home Office Factory Department which have a real permanent value and embody technical investigation of a high order, though their foolscap form without a proper cover makes them a little unhandy for reference.

The responsibilities of employers in regard to accidents have been briefly as follows, but serious increases are contemplated, as shown by figures in brackets.¹

Home Office
Reports.

Employers'
Liability.
p. 53.

Workmen's Compensation Act, 1906.

This Act provides for the payment by the employer to workmen injured in his service (or in the service of any Sub-contractor employed by him on work undertaken by him) compensation as follows :

IN CASE OF DEATH, where the deceased leaves persons dependent upon his earnings at the time of his death, *three years' earnings*, not less than £150, nor more than £300 [£800.]

When there are no dependents, a sum for medical and funeral expenses not exceeding £10

DURING TOTAL DISABLEMENT :

If under 21 years of age, full wages up to 10s. per week. [31ds Wages—subject to review.]

If over 21 years of age, half wages, not exceeding 20s. per week. [3rds Wages,—Max £3.]

Payable after the first week, or from the first day of disablement if the period is 14 days or longer. [After three days.]

IN THE EVENT OF THE INJURY BEING PERMANENT, THE FOREGOING COMPENSATION WOULD REQUIRE TO BE PAID FOR THE WHOLE TERM OF LIFE.

INDUSTRIAL DISEASES :

In the event of disability arising from specific diseases due to the nature of the employment, compensation has to be paid as if a personal injury by accident had been sustained.

By an Amendment Act, 1919, the weekly payments were increased by 75 per cent.

There are other liabilities, arising out of accidents, that have to be met by the employer, viz.

¹ [Cmd 816, 1920]—Departmental Committee's Report on Workmen's Compensation.

Employers' Liability.*Employers' Liability Act, 1880.*

All Employers of labour are liable under this Act to pay heavy damages for injuries caused by the negligence of any person in the service of the Employer entrusted with the superintendence of the workmen, or by reason of any defect in the condition of the ways, works, machinery or plant connected with, or used in, the business of the Employer.

The liability under the Act is not limited to the payment of wages during incapacity, but the sum awarded must not exceed three years' earnings of the injured person.

Fatal Accidents Act, 1846, and the Common Law.

By the Common Law an Employer is bound to take reasonable precautions to ensure the safety of his workmen

There is no limit to the amount a jury may award as damages for injuries caused by neglect to fulfil this obligation

Employers are liable at Common Law for accidents to persons not in their employment, caused by the carelessness or negligence of their servants.

Industrial Courts Acts.

p. 189.

The recent legislation relative to the formation of Industrial Courts, virtually continuing the work of the Munitions Tribunals, has great possibilities in the development of equitable conditions of employment. The constitution and purpose of the new Act will be evident from the following extract.

Extract from Industrial Courts Act, 1919.¹

PART I INDUSTRIAL COURTS

For the purpose of the settlement of trade disputes there shall be a standing Industrial Court, consisting of persons to be appointed by the Minister of Labour, of whom some shall be independent persons, some shall be persons representing employers, and some shall be persons representing workmen, and in addition one or more women.

* * * * *

Any trade dispute as defined by this Act, whether existing or apprehended, may be reported to the Minister by or on behalf of either of the parties to the dispute, and the Minister shall thereupon take the matter into his consideration and take such steps as seem to him expedient for promoting a settlement thereof

Where a trade dispute exists or is apprehended, the Minister may, subject as hereinafter provided, if he thinks fit and if both parties consent, either—

- (a) refer the matter for settlement to the Industrial Court; or
- (b) refer the matter for settlement to the arbitration of one or more persons appointed by him; or
- (c) refer the matter for settlement to a board of arbitration consisting of one or more persons nominated by or on behalf of the employers concerned and an equal number of persons nominated by or on behalf of the workmen concerned, and an independent chairman nominated by the Minister, and, for the purpose of facilitating the nomination of persons to act as members of a board of arbitration, the Minister of Labour shall constitute panels of persons appearing to him suitable so to act, and women shall be included in the panels.

The Minister may refer to the Industrial Court for advice any matter relating to or arising out of a trade dispute, or trade disputes in general or trade disputes of any class, or any other matter which in his opinion ought to be so referred.

¹ By permission of The Controller of H.M. Stationery Office.

If there are existing in any trade or industry any arrangements for settlement by conciliation or arbitration of disputes in such trade or industry, or any branch thereof, made in pursuance of an agreement between organisations of employers and organisations of workmen representative respectively of substantial proportions of the employers and workmen engaged in that trade or industry, the Minister shall not, unless with the consent of both parties to the dispute, and unless and until there has been a failure to obtain a settlement by means of those arrangements, refer the matter for settlement or advice in accordance with the foregoing provisions of this section.

* * * * *

PART II. COURTS OF INQUIRY.

Where any trade dispute exists or is apprehended, the Minister may, whether or not the dispute is reported to him under Part I. of this Act, inquire into the causes and circumstances of the dispute, and, if he thinks fit, refer any matters appearing to him to be connected with or relevant to the dispute to a court of inquiry appointed by him for the purpose of such reference, and the court shall, either in public or in private, at their discretion, inquire into the matters referred to them and report thereon to the Minister.

* * * * *

A court of inquiry may, if and to such extent as may be authorised by rules made under this section, by order require any person who appears to the court to have any knowledge of the subject-matter of the inquiry to furnish, in writing or otherwise, such particulars in relation thereto as the court may require, and, where necessary, to attend before the court and give evidence on oath, and the court may administer or authorise any person to administer an oath for that purpose.

* * * * *

PART IV. GENERAL.

For the purposes of this Act :—

The expression "trade dispute" means any dispute or difference between employers and workmen, or between workmen and workmen connected with the employment, or non-employment, or the terms of the employment or with the conditions of labour of any person.

The expression "workman" means any person who has entered into or works under a contract with an employer whether the contract be by way of manual labour, clerical work, or otherwise, be expressed or implied, oral or in writing, and whether it be a contract of service or of apprenticeship or a contract personally to execute any work or labour.

Provision shall be made by rules under this Act with respect to the cases in which persons may appear by counsel or solicitor on proceedings under this Act before the Industrial Court, before an arbitrator or before a court of inquiry, and except as provided by those rules no person shall be entitled to appear on any such proceedings by counsel or solicitor.

* * * * *

III c

TRADE UNION AGREEMENTS

**Collective
Bargaining.**

THE principle of collective bargaining is generally accepted in this country as between employers' federations and trade unions. There have been varying degrees of loyalty shown by the members of the trade unions in adhering to contracts entered into by their representatives; but there is no need yet to doubt that in the main trade unions can be relied on to stand by their undertakings.

It is very obvious that if there is to be any notable measure of prosperity for all ranks, mutual agreements that will be loyally and willingly observed by both parties are essential to the concentration of effort on the production by which alone prosperity for either side can be achieved.

There are so many trade unions, and trade practices vary so greatly that if adequate information were collected, its volume would prohibit inclusion here.

The engineering trades furnish most important examples, and it will be convenient to limit the cases cited to the agreements in force in that trade. The membership of the principal trade union concerned, viz. the Amalgamated Society of Engineers—usually referred to as the A.S.E.—was stated in December, 1919, to be 320,880. To this large number must be added the membership of allied trades affected by the agreements mentioned below.

There has been of late in industry a marked advance made towards establishing national agreement in place of the local agreement that frequently obtained previously. In consequence of this development, there is a tendency for local or district rates to give place to national rates—the latest railway agreement being the most notable case in point.

**Engineering
Trades'
Agreements.**

An agreement involving far-reaching principles was reached in the Engineering Trades on 1st October, 1907. This agreement grew out of previous agreements, and although the principal trades union concerned—the Amalgamated Society of Engineers—have

withdrawn from this particular agreement, they and others entered into another agreement on 17th April, 1914, relative to the avoidance of disputes, which may be said to keep alive the essential spirit of the more detailed 1907 agreement. Both agreements are given in full below.

Agreement

MADE THIS 1ST DAY OF OCTOBER, 1907,

BETWEEN

The ENGINEERING EMPLOYERS' FEDERATION (hereinafter called the "Federation") of the one part,

AND

The AMALGAMATED SOCIETY OF ENGINEERS, the STEAM ENGINE MAKERS' SOCIETY, and the UNITED MACHINE WORKERS' ASSOCIATION (hereinafter called the "Trade Unions") of the other part.

The Federation on the one hand, and the Trade Unions on the other, being convinced that the interests of each will be best served, and the rights of each best maintained by a mutual agreement, hereby, with a view to avoid friction and stoppage of work, agree as follows :—

1. *General Principles of Employment.*

The Federated Employers shall not interfere with the proper functions of the Trade Unions, and the Trade Unions shall not interfere with the Employers in the management of their business.

2. *Employment of Workmen.*

Every Employer may belong to the Federation, and every workman may belong to a Trade Union or not, as either of them may think fit.

Every Employer may employ any man, and every workman may take employment with any Employer, whether the workman or the Employer belong or not to a Trade Union or to the Federation respectively.

The Trade Unions recommend all their Members not to object to work with non-Union workmen, and the Federation recommend all their Members not to object to employ Union workmen on the ground that they are Members of a Trade Union.

No workman shall be required, as a condition of employment, to make a declaration as to whether he belongs to a Trade Union or not.

3. *Piecework.*

Employers and their workmen are entitled to work piecework, provided :—

- (a) The prices to be paid shall be fixed by mutual arrangement between the employer and the workman or workmen who perform the work.
- (b) Each workman's day rate to be guaranteed irrespective of his piecework earnings.
- (c) Overtime and nightshift allowances to be paid in addition to piecework prices, on the same conditions as already prevail in each workshop for time work.

All balances and wages to be paid through the Office.

F 156.

4. *Overtime.*

The Federation and the trade Unions are agreed that systematic overtime is to be deprecated as a method of production, and that when overtime is necessary the following is mutually recommended as a basis, viz. :—

That no Union workman shall be required to work more than 32 hours overtime in any four weeks after full shop hours have been worked, allowance being made for time lost through sickness, absence with leave, or enforced idleness.

In the following cases overtime is not to be restricted :—

Breakdown work, repairs, replacements or alterations for the employers or their customers.

Trial trips and repairs to ships.

Urgency and emergency.

p. 251.

p. 250.

**Engineering
Trades'
Agreements.**

Engineering Trades' Agreements.**5. Rating of Skilled Workmen.**

Employers have the right to employ workmen at rates of wages mutually satisfactory to the employer and the workman, or workmen, concerned.

In fixing the rates of skilled workmen, the employer shall have regard to the rates prevailing in the district for fully trained and skilled men.

Unions, while disclaiming any right to interfere with the wages of workmen other than their own members, have the right in their collective capacity to arrange the rate of wages at which their members may accept work.

General alterations in the rates of wages in any district shall be negotiated between the Employers' Local Association and the Local representatives of the Trade Union or Unions concerned.

p. 240.

6. Apprentices.

There shall be no recognised proportion of apprentices to journeymen, but it shall be open to the Unionists to bring forward for discussion the proportion of apprentices generally employed in the whole Federated area.

An apprentice shall be afforded facilities for acquiring a practical knowledge of the branch of trade he adopts, and shall be encouraged to obtain a theoretical knowledge thereof as far as circumstances permit.

p. 237.

7. Selection, Training, and Employment of Operatives and Manning of Machine Tools.

Employers have the right to select, train, and employ those whom they consider best adapted to the various operations carried on in their workshops, and to pay them according to their ability as workmen.

Employers, in view of the necessity of obtaining the most economical production, whether by skilled or unskilled workmen, have full discretion to appoint the men they consider suitable to work all their machine tools, and to determine the conditions under which they shall be worked.

The Federation recommend their members that, when they are carrying out changes in their workshops which will result in displacement of labour, consideration should be given to the case of the workmen who may be displaced, with a view, if possible, of retaining their services on the work affected, or finding other employment for them.

8. Provisions for avoiding disputes.

With a view to avoid disputes, deputations of workmen shall be received by their employers, by appointment, for mutual discussion of any question in the settlement of which both parties are directly concerned; or it shall be competent for an official of the Trade Union to approach the Local Secretary of the Employers' Association with regard to any such question; or it shall be competent for either party to bring the question before a Local Conference to be held between the Local Association of Employers and the Local Representatives of the Trade Unions.

In the event of either party desiring to raise any question, a Local Conference for this purpose may be arranged by application to the Secretary of the Employers' Association, or of the Trade Union concerned, as the case may be.

Local Conferences shall be held within twelve working days from the receipt of the application by the Secretary of the Employers' Association, or of the Trade Union or Trade Unions concerned.

Failing settlement at a Local Conference of any question brought before it, it shall be competent for either party to refer the matter to the Executive Board of the Federation and the Central Authority of the Trade Union or Trade Unions concerned.

Central Conferences shall be held at the earliest date which can be conveniently arranged by the Secretaries of the Federation and of the Trade Union or Trade Unions concerned.

There shall be no stoppage of work, either of a partial or of a general character, but work shall proceed under the current conditions until the procedure provided for above has been carried through.

9. Constitution of Conferences.

An Organising Delegate of the Amalgamated Society of Engineers shall be recognised as a Local Official entitled to take part in any Local Conference, but only in his own division. In case of sickness, his place shall be taken by a substitute appointed by the Executive Council.

Any member of the Executive Council, or the General Secretary of the Amalgamated Society of Engineers, may attend Local Conferences, provided that the member of the Executive Council shall attend only such Conferences as are held within the division represented by him. **Engineering Trades Agreements.**

A member of the Executive Council, or the General Secretary of the Steam Engine Makers' Society and of the United Machine Workers' Association respectively, may attend any Local Conference in which the Societies, or either of them, are directly concerned.

Central Conferences shall be composed of members of the Executive Board of the Federation and members of the Central Authority of the Trade Union or Trade Unions concerned.

An employer who refuses to employ Trade Unionists will not be eligible to sit in Conferences.

The following Trade Unions are parties to this agreement, viz. :—

AMALGAMATED SOCIETY OF ENGINEERS.

STEAM ENGINE MAKERS' SOCIETY.

UNITED MACHINE WORKERS' ASSOCIATION.

SOCIETY OF AMALGAMATED TOOLMAKERS, ENGINEERS AND MACHINISTS.

SCIENTIFIC INSTRUMENT MAKERS' TRADE SOCIETY.

UNITED KINGDOM SOCIETY OF AMALGAMATED SMITHS AND STRIKERS.

The following are parties to "Provisions for avoiding disputes" :—

ELECTRICAL TRADES UNION.

NATIONAL SOCIETY OF AMALGAMATED BRASS WORKERS AND METAL MECHANICS

UNITED JOURNEYMEN BRASSFOUNDERS, TURNERS, FITTERS, FINISHERS AND COPPERSMITHS' ASSOCIATION OF GREAT BRITAIN AND IRELAND.

Agreement

MADE ON 17TH APRIL, 1914,

BETWEEN

THE ENGINEERING EMPLOYERS' FEDERATION AND THE AMALGAMATED SOCIETY OF ENGINEERS.

When a question arises, an endeavour shall be made by the management and the workmen directly concerned to settle the same in the works or at the place where the question has arisen. Failing settlement deputations of workmen who may be accompanied by their Organising District Delegate (in which event a representative of the Employers' Association shall also be present), shall be received by the Employers by appointment without unreasonable delay for the mutual discussion of any question in the settlement of which both parties are directly concerned. In the event of no settlement being arrived at, it shall be competent for either party to bring the question before a Local Conference to be held between the Local Association and the Local representatives of the Society.

In the event of either party desiring to raise any question a Local Conference for this purpose may be arranged by application to the Secretary of the Local Association or to the Local representatives of the Society.

Local Conferences shall be held within seven working days unless otherwise mutually agreed upon from the receipt of the application, by the Secretary of the Local Association or the Local representative of the Society.

Failing settlement at a local Conference of any question brought before it it shall be competent for either party to refer the matter to a Central Conference which, if thought desirable, may make a joint recommendation to the constituent bodies.

Central Conferences shall be held on the second Friday of each month at which questions referred to Central Conference prior to fourteen days of that date shall be taken.

**Engineering
Trades'
Agreement.**

Until the procedure provided above has been carried through, there shall be no stoppage of work, either of a partial or a general character.

The following have since become parties to "Provisions for avoiding disputes," similar to those dated 17th April, 1914 :—

THE WORKERS' UNION.

THE NATIONAL UNION OF GENERAL WORKERS.

THE NATIONAL AMALGAMATED UNION OF LABOUR.

THE AMALGAMATED SOCIETY OF COREMAKERS OF GREAT BRITAIN AND IRELAND.

THE NATIONAL AMALGAMATED UNION OF ENGINEERS, FIREMEN, MECHANICS MOTORMEN AND ELECTRICAL WORKERS

THE ASSOCIATED BLACKSMITHS AND IRON WORKERS' SOCIETY OF GREAT BRITAIN AND IRELAND.

AMALGAMATED SOCIETY OF GAS, MUNICIPAL AND GENERAL WORKERS.

NAVVIERS, BUILDERS' LABOURERS AND GENERAL LABOURERS' UNION

DOCK, WHARF, RIVERSIDE AND GENERAL WORKERS' UNION OF GREAT BRITAIN AND IRELAND.

**Payment by
Results.**

p. 128.

p. 251.

There are two agreements in force in the Engineering Trades relative to systems of payments by results. (1) The "Carlisle" agreement regarding the premium system—called therein the premium bonus system ; (2) The Piecework agreement of 1st April, 1919. Particulars of both are given below.

The Premium Bonus System.

MEMORANDUM OF DECISION in Central Conference between the EXECUTIVE of the ENGINEERING EMPLOYERS' FEDERATION and the EXECUTIVE COUNCIL of the AMALGAMATED SOCIETY OF ENGINEERS, held at Carlisle, August 19 and 20, 1902.

1. That the employers' representatives should convey the terms of the following memorandum to the members of the Federation, and
2. That the representatives of the A S E should, on the other hand, remove all restrictions to the working of a bonus scheme in federated workshops.

MEMORANDUM REFERRED TO.

The employers' representatives have not the power to settle the conditions which should be observed in connection with the working of a bonus system, without having previously obtained authority from the Federation in proper form.

They are, however, prepared to advise all employers who wish to establish such a system in the meantime to adopt the following suggestions :

1. The time-rate of wages (for each job) should in all cases be paid.
2. Overtime and nightshifts to be paid on the same conditions as already prevail in each workshop
3. A time limit, after it has been established, should only be changed if the method or means of manufacture are changed.
4. No firm should establish the bonus system without intending to adhere to it

Piecework Prices.

AGREEMENT OF 1ST APRIL, 1919,

BETWEEN

THE ENGINEERING & THE NATIONAL EMPLOYERS' FEDERATIONS
ANDTHE AMALGAMATED SOCIETY OF ENGINEERS, STEAM ENGINE MAKERS' SOCIETY,
UNITED MACHINE WORKERS' ASSOCIATION, TOOLMAKERS' SOCIETY,
ELECTRICAL TRADES UNION, SMITHS & STRIKERS' SOCIETY, BRASS-
FOUNDERS' SOCIETY, AMALGAMATED INSTRUMENT MAKERS' TRADE
SOCIETY, AND BRASSWORKERS' SOCIETY.Payment by
Results.
p. 211.
p. 251.

* Where, by reason of the introduction of the 47 hours week, a workman is not able to earn on piece work his previous remuneration on the same job, the employers will undertake to recommend that suitable adjustment shall be made on the piecework price for that job

It is agreed that Piecework prices should be such as will enable a workman of average ability to earn at least 33 1/3 per cent over present time rates (excluding war bonuses). Piecework prices once established shall not be altered unless the means or method of manufacture is changed

Meantime it is agreed that where prices are such that on account of the reduction in hours the workman of average ability is unable to earn 33 1/3 per cent the necessary adjustment should be made.

p. 129.

It is to be noted that the above agreement recognises a normal earning of time and a third under piecework, as compared with the previous almost universal basis of time and a quarter.

A new agreement relative to the recognition of shop stewards and their service on works committees was reached in June 1919, and particulars of same are given below. This agreement deals with a very contentious matter and its successful operation will call for a willingness to learn on the part of the shop stewards and an increased administrative skill and knowledge on the part of the management.

Shop
Stewards.
p. 182.

MEMORANDUM OF AGREEMENT made . . . June, 1919, between the Engineering and the National Employers' Federations and the Amalgamated Society of Engineers, Steam Engine Makers' Society, United Machine Workers' Association, Amalgamated Instrument Makers' Trade Society, Society of Amalgamated Toolmakers, Engineers and Machinists, United Kingdom Society of Amalgamated Smiths and Strikers, Electrical Trades Union, National Society of Amalgamated Brassworkers and Metal Mechanics, United Journeymen Brassfounders, Fitters, Turners, Finishers, and Coppersmiths' Association of Great Britain and Ireland.

Regulations regarding the Appointment and Functions of Shop Stewards and Works Committees.

With a view to amplifying the provisions for avoiding disputes by the recognition of shop stewards and the institution of works committees, it is agreed as follows :—

(a) Appointment of Shop Stewards.

1. Workers, members of the above-named Trade Unions, employed in a federated establishment may have representatives appointed from the members of the unions employed in the establishment, to act on their behalf in accordance with the terms of this agreement.

**Shop
Stewards.**

2. The representatives shall be known as shop stewards.
3. The appointment of such shop stewards shall be determined by the Trade Unions concerned, and each Trade Union party to this agreement may have such shop stewards.
4. The names of the shop stewards and the shop or portion of a shop in which they are employed and the Trade Union to which they belong shall be intimated officially by the Trade Union concerned to the management on election.

(b) Appointment of Works Committees.

5. A works committee may be set up in each establishment consisting of not more than seven representatives of the management and not more than seven shop stewards, who should be representative of the various classes of workpeople employed in the establishment.

The shop steward for this purpose shall be nominated and elected by ballot by the workpeople, members of the Trade Unions parties to this agreement employed in the establishment.

The shop stewards elected to the works committee shall, subject to re-election, hold office for not more than twelve months.

6. If a question falling to be dealt with by the works' committee in accordance with the procedure hereinafter laid down arises in a department which has not a shop steward on the works committee, the works committee may, as regards that question, co-opt a shop steward from the department concerned. An agenda of the points to be discussed by the works committee shall be issued at least three days before the date of the meeting if possible.

(c) Functions and Procedure.

7. The functions of the shop stewards and works committee, so far as they are concerned with the avoidance of disputes, shall be exercised in accordance with the following procedure :—

(a) A worker or workers desiring to raise any question in which they are directly concerned shall in the first instance discuss the same with their foreman.

(b) Failing settlement, the question shall be taken up with the shop manager and/or head shop foreman by the appropriate shop steward and one of the workers directly concerned.

(c) If no settlement is arrived at, the question may, at the request of either party, be further considered at a meeting of the works committee. At the meeting the Organising District Delegate may be present, in which event a representative of the Employers' Association shall also be present.

(d) Any question arising which affects more than one branch of trade or more than one department of the works may be referred to the works committee.

(e) The question may thereafter be referred for further consideration in terms of the "Provisions for Avoiding Disputes."

(f) No stoppage of work shall take place until the question has been fully dealt with in accordance with this agreement and with the "Provisions for Avoiding Disputes."

(d) General.

8. Shop stewards shall be subject to the control of the Trade Unions, and shall act in accordance with the rules and regulations of the Trade Unions and agreement with employers so far as these affect the relation between employers and workpeople.

9. In connection with this agreement shop stewards shall be afforded facilities to deal with the question raised in the shop or portion of a shop in which they are employed. Shop stewards elected to the works committee shall be afforded similar facilities in connection with their duties, and in the course of dealing with these questions they may, with the previous consent of the management (such consent not to be unreasonably withheld) visit any other shop or portion of a shop in the establishment. In all other respects shop stewards shall conform to the same working conditions as their fellow workers.

10. Negotiations under this agreement may be instituted either by the management or by the workers concerned.

11. Employers and shop stewards and works committee shall not be entitled to enter into any agreement inconsistent with agreements between the federation or local association and the Trade Unions.

12. For the purpose of this agreement the expression "establishment" shall mean the whole establishment or sections thereof according to whether the management is unified or sub-divided.

13. Any question which may arise out of the operation of this agreement shall be brought before the Executive of the Trade Union concerned or the Federation as the case may be.

14. This agreement supersedes the agreement dated 20th December, 1917, entitled "Regulations Regarding the Appointment and Functions of Shop Stewards," made between the Engineering Employers' Federation and the Trade Unions.

The conference which took place at York in February, 1920, between the Engineering and National Employers' Federations on the one hand and the various Trade Unions concerned on the other, relative to the conditions that should obtain in the Engineering Trades in conjunction with the 47 hours working week, is likely to prove of far-reaching importance.

Memorandum
of York
Conference.

The lesser skilled Trade Unions have reached agreement with the employers on the lines set out below, but settlement has yet to be reached with the skilled or craft unions as typified by the Amalgamated Society of Engineers.

47 Hours Working Week—Working Conditions.

MEMORANDUM OF AGREEMENT

BETWEEN

THE ENGINEERING AND THE NATIONAL EMPLOYERS' FEDERATIONS

AND THE VARIOUS UNIONS AFFILIATED TO

THE NATIONAL FEDERATION OF GENERAL WORKERS

as adjusted at Conference held at York on 2nd, 3rd, and 4th February, 1920.

The following proposals are to be read and construed together, and are subject to acceptance as a whole and not as a part or parts thereof.

The proposals are standard and not minimum proposals.

The question of the working of a two-shift day or a three-shift system shall be the subject of consideration in Special Conference at an early date.

These conditions shall not apply to workpeople who work in conjunction with branches of industry not covered by this Agreement.

This Agreement shall take effect on and from the commencement of the fourth full pay day after acceptance by all parties.

I. OVERTIME.

(a) A full day shall be worked before overtime is reckoned, with the following exceptions, viz.:—time lost through sickness certified to the satisfaction of the Employers; lying off on account of working all the previous night; absence with leave or enforced idleness.

(b) Where works are on short time no overtime shall be paid for work done between the full time starting hour and the full time stopping hour, but work beyond these limits shall be paid for as overtime, provided the full shortened day has been worked:

Memorandum
of York
Conference.

(c) A workman working through his meal hour shall be paid at overtime rate unless equivalent in time is allowed.

(d) Overtime for each day worked either before or after the normal working hours shall be paid at the rate of *time and half* for all hours worked calculated on the dayshift rate.

(e) All hours worked between 12 midnight on Saturday and 12 midnight on Sunday shall be paid for at *double time*.

(f) The Federations and the Trade Unions are agreed that systematic overtime is to be deprecated as a method of production, and that when overtime is necessary the following is mutually recommended as a basis, viz. :—

That no Union workmen shall be required to work more than 32 hours overtime in any four weeks after full shop hours have been worked, allowance being made for time lost through sickness, absence with leave, or enforced idleness.

In the following cases overtime is not to be restricted :—

Breakdown work, repairs, replacements or alterations for the employers or their customers : Trial Trips and repairs to ships ; Urgency and emergency.

p. 250.

II. NIGHTSHIFT.

(a) Nightshift is where men, other than dayshift men, work throughout the night for not less than three consecutive nights

(b) A full nightshift week shall consist of 47 working hours worked on five nights with one or two breaks for meals each night to be mutually arranged

(c) The nightshift of 47 hours shall be paid at the rate of *time and a third* calculated on the dayshift rate. All other time worked after the full night has been worked shall be paid at the rate of *time and two-thirds* calculated on dayshift rates.

(d) Nightshift men when required to work on Saturday and/or Sunday nights shall be paid at the rate of *time and two-thirds* calculated on dayshift rates for all hours worked prior to Saturday midnight and after Sunday midnight. All time worked between Saturday midnight and Sunday midnight shall be paid at *double time* rates, calculated on dayshift rates

(e) Dayshift men who have worked during the day beyond the meal hour and are required to go on to nightshift the same night, shall be paid for the night's work ordinary overtime rates. Dayshift men who have been notified that they have to go on nightshift the same night and are allowed home for dinner time that day, shall be paid nightshift rate.

p. 251.

III. HOLIDAYS.

Sundays and Christmas Day (or New Year's Day in Scotland)

All work done on these days shall be paid for at *double time* calculated on the day rate.

Good Friday.

All work done on Good Friday in districts in which it has been the practice to recognise Good Friday as a Holiday shall be paid for at *double time* calculated on the day rate.

Other Holidays.

In each district work done on all single recognised holidays or on the first three days of a holiday period shall be paid for at *time and a half* calculated on the day rate, the holidays to be so paid shall be determined locally.

p. 128.
p. 231.
p. 251.

IV. SYSTEMS OF PAYMENT BY RESULTS.

Employers shall have freedom to introduce Systems of Payment by Results satisfactory to the men and the employer concerned subject to the following conditions :—

1. In all cases the time rate of the workmen concerned shall be guaranteed irrespective of earnings.

2. Overtime and Nightshift and Sunday and Holiday Allowances shall be paid in addition to earnings under any system of payment by results on the

same conditions as already prevail in the Trade and district in question for **Memorandum of York Conference.**
time work. p. 136.

3. The price to be paid or basis time to be allowed either for a new job or for an altered job shall be fixed by mutual arrangement between the employer and the workman who is to perform the work or by such other methods as now exist or may hereafter be established by agreement in any trade or district.

4. No piecework price, bonus or basis time once fixed may be altered unless the material, means or method of production is changed.

5. When the material, means or method of production is changed and the employer desires a modification in price or basis time, the modification shall in no case be such as to effect a reduction in the earnings of the workers concerned. p. 132.

6. When piecework, bonus or basis time system is in operation and an employer desires a workman or workmen to undertake a job for which no price or basis time has previously been fixed, the employer shall, either before, or as soon as possible after the job has been given out, see the workman or workmen concerned with a view to agreement in accordance with the terms of this agreement.

7. In the event of a workman taking exception to any price or basis time allowed and being unable to arrive at a settlement, the matter shall be dealt with by deputation of workmen consisting of the workman affected and two others engaged in the branch of trade in the shop concerned, who shall endeavour to effect a settlement with the management within seven days.

8. All settlements shall be retrospective to the commencement of the job on which the question is raised.

9. No debit balance shall be carried forward beyond the weekly or other mutually recognised period of settlement.

10. All balances and wages shall be paid through the office in proportion to the time worked and time rates of the workman or workmen on the job.

11. The employers shall in all cases supply the workmen with a card stating the nature of each job and the price or basis time allowed, such card to be retained by the workmen for reference until completion of the job. p. 195.
p. 365.

12. Piecework Prices and bonus or basis times shall be such as will enable a workman of average ability to earn at least 33½ % over present time rates (excluding war bonuses). p. 129.
p. 207.

V. EXTENSIONS OF SYSTEMS OF PAYMENT BY RESULTS.

p. 234.

It was agreed that a Special Conference shall be held at an early date to discuss schemes of Systems of Payment by Results, such as to include within their scope those men whose work is contributory to production but who are not directly engaged on a productive process.

VI. CONSOLIDATION OF WAGES.

It was agreed that this question should be the subject of a Special Conference to be held at an early date.

In view of the discussion elsewhere in the book, it may be well to point out that the term *job rate* as used is intended to cover either piecework price, bonus or basis time, in the sense intended by the above agreement. The bonus or basis time has reference to the premium system, or as it was for some time called, the premium bonus system, and it would have seemed better to have dropped the word bonus rather than premium—certainly both are not necessary. As to the term basis time, this refers to the basis for payment computations, but not to the real basis of estimated time from which the job rate is derived. p. 129.

III D

WORKING CONDITIONS

**Scope of
Section.**

IN the previous section detailed reference was made to government regulations under the Factory and Workshop Acts and it will be readily appreciated that large issues flow from a consideration of (1) the legal requirements as to working conditions and (2) the physical efficiency of the workers.

The term working conditions can be given a very wide significance extending even to rates of pay and shop discipline, but it is a reasonable limitation to consider the appropriate field for this section as follows :—

Hours of work.
Fatigue and Health.
Works Hygiene.
Accident Prevention.
Accident Treatment.

Before dealing with the subject under the above headings, it will be helpful to review the possibilities of a works medical referee as a personal factor in management, based on actual experience during the war. The comment that will at once arise is that during the war all sorts of expensive schemes found or seemed to find their justification and, in the present connection, that the shortage of able bodied labour created conditions which peculiarly lent themselves to a medical solution. Admitted that it was easy during the war to try the experiment of a works medical referee and that the results were likely to be exceptionally favourable, yet, after discounting those temporary factors, a large field undoubtedly remains for medical supervision of each community of workers proving of the highest personal value to each worker and at the same time yielding an economic return on the expenditure involved—or in other words, that it pays.

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The extent by which properly-directed medical service may favourably affect efficiency is, as yet, insufficiently appreciated.

By 'medical service' in this connection much more is meant than merely adequate first-aid arrangements with suitable treatment given for injuries sustained by the employees at their work.

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P. 77.

Such provision is essential, of course, and is now usual, first-aid being carried out satisfactorily on the whole, and this without the supervision of a fully-qualified medical man.

Where, however, a works' doctor has been engaged, either for whole-time or part-time employment, the management is ordinarily too much inclined to require services devoted to treatment of injuries and sickness rather than to work of a more preventive character, although the benefits to both workers and employers arising from the latter are of first-rate importance.

The relationship of the works medical referee to the industrial concern with which he is identified should be that which the medical officer of health bears to a district rather than that of the general practitioner, *i.e.* he should be engaged in preserving healthy conditions and preventing disease rather than in dealing with ill-health after it has arisen. More closely analogous, perhaps, in some respects, is the work of the school medical officer. School-children receive individual attention from the school medical officer working under the authority of the medical officer of health, the chief aim being to prevent the onset and development of disease. The same protective and preventive work, suitably modified to be acceptable, is needed as much, if not needed more, by industrial workers but is seldom provided.

A brief consideration here of the duties which should be fulfilled by a works medical referee, indicating the lines along which he should be required to work and the results to be anticipated, if suitable methods based on a sound system be adopted, will itself sufficiently demonstrate that the expense entailed is justified. That this is so will be readily understood when it is appreciated that the work of the works medical referee may properly be judged by its effects on the lost-time rate. Successful efforts to reduce the rates of sickness, fatigue and accident will inevitably be reflected directly in the lost-time rate.

So numerous are the ways in which the time at the disposal of a works medical referee may be used beneficially, that selection will have to be made, especially if his appointment be only a part-time one, of those duties which suit best the requirements of the management concerned; though it will be found in practice that the interviewing of employees after absence is itself sufficiently comprehensive to enable sound opinions to be formed so that measures may be framed according to the needs disclosed.

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p. 255.

Apart altogether from supervising the nursing staff, the casualty room and the first-aid arrangements, including, perhaps, the holding of first-aid classes, the works medical referee (or W.M.R.) will have duties of a general or an occasional nature to perform, such as visiting employees in their own homes or in hospitals in certain circumstances; assisting to preserve suitable and helpful relations with the medical men of the neighbourhood and the authorities of institutions, such as hospitals; attending post-mortem examinations and inquests where such affect the interests of the firm.

Additionally, all suffering from injuries due to accidents should be kept under close observation by him, being required to present themselves, if fit to do so, at least once a week—preferably on a selected day—in order that progress may be noted; to ensure also that no injured worker is neglecting to obtain treatment and to prevent undue delay in return to work after recovery is sufficiently advanced to justify a restart being made.

Opinions concerning such general questions as ventilation, heating, lighting and sanitation viewed from the medical standpoint can be looked for where such advice is needed.

Mainly, however, the attention of the W.M.R. will be occupied in connection with measures aiming at the prevention of sickness, fatigue and accident and for such measures to yield successful results three factors will be found essential:

Careful record-keeping.

Certain medical examinations.

Interviewing by the W.M.R. of all employees returning to work after absence, whatever cause be alleged for that absence.

Concerning careful record-keeping little need be said here beyond reaffirming the fact that general impressions concerning such matters as lost-time rate, sick-rate, etc., are so often misleading, because wrong to a surprising degree, and that only by keeping records with exactness can progress, if it exist, be gauged correctly. One may add that of all records, an individual attendance record F 150 card is the most essential in this connection and the card should F 149 be drawn up in such a way that all absences can be seen at a glance as well as the reasons for them. It proves, indeed, to be the basis on which the work of the W.M.R. rests.

In the matter of ensuring medical examinations, selection here may prove to be unavoidable if only because of the amount of time involved. Hence the management will need to decide which class of medical examination will be best suited to its own needs, bearing

in mind that a certain number of what might be regarded as ' incidental ' examinations will in any case arise during the ordinary routine of the W.M.R.'s work.

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Periodical examinations yield good results if it be practicable to carry them out regularly and systematically. Usually, however, it will be found convenient to attempt no periodical examinations beyond those of employees suffering from chronic complaints, such as heart-trouble, varicose veins, etc., or other disabilities such as those arising from war-wounds. Lack of time will usually prevent more being done effectively.

The same limitation, as well as other possible difficulties, applies to the medical examination of all applying for employment, though disabled ex-service men should be examined, if only in their own interests, as also, if possible, should women and young persons.

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Employees applying for light work will, of necessity, require to be examined and so will those who have been away from work because of injury, as well as many of those who have been away through illness.

To some extent the beneficial effects of medical examinations upon efficiency arise, of course, from the elimination of the totally unfit, but even more important results accrue from the prevention of individual workers undertaking employment which is too heavy or otherwise unsuitable. Without the attempt made thus to assign only suitable work to employees who for one reason or another cannot efficiently perform heavy labour without injury to themselves—and their number is far greater than is usually recognised—it is not reasonable to expect that the amount of sickness and fatigue can be kept at a minimum, nor, consequently, that the well-being of the workers and their timekeeping can be maintained at the highest level. On the other hand, an employee engaged—perhaps unknowingly—on unsuitable work and consequently proving inefficient and a bad timekeeper, because often ailing, can be converted into an efficient worker, keeping good time and enjoying satisfactory health, much more easily than one might suppose, once the cause has been identified. The difficulty of dealing with each case is however practically insurmountable in the absence of medical advice.

Only by interviewing, on their return to work, all employees who have been absent, can the works medical referee keep in close touch with those who most need his services and gain that intimate and personal knowledge of the health conditions among the employees which is essential if his efforts are to produce good results.

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Interviews of this kind not only in themselves serve very many useful purposes but also maintain in active operation and co-ordinate the most important functions fulfilled by the doctor, doing so in a manner difficult to accomplish successfully in any other way.

Sick and injured returning to work before they have sufficiently recovered—and they are surprisingly numerous—are prevented from doing so, to their own and the firm's ultimate benefit.

The onset of disease can be recognised and guarded against, especially if the W.M.R.—having gained their confidence—be looked upon by the workers as anxious to assist them, and early pulmonary tuberculosis, heart-strain and other serious conditions can be identified at a stage where cure may be comparatively easy.

The effect of this system of interviewing by the W.M.R. in reducing the lost-time rate can be profound and the greater the amount of time lost previously, the more noticeable the reduction. Indeed it may safely be stated that by no other method can a lost-time rate be reduced so certainly, so speedily, or—if properly carried out—with so little friction.

All employees know, of course, that absence from work is either justifiable or it is unjustifiable, but they also know the extreme difficulty usually attaching to a correct classification of their absence by the employer. To relegate absences to their proper category, especially if frequently repeated, is a comparatively simple matter, however, for a W.M.R. who, interviewing the employee after each absence and being competent to interpret and value appropriately medical certificates which have been presented, can often confirm or refute allegations of disability. The amount of lost time, therefore, is lessened by the operation of many factors other than the effects of the reduction of the rates of sickness and fatigue, and the following deserve particular notice.

The hopelessly unfit can be eliminated as also can those who persistently lose time through drinking or other vicious habits, and those suffering from infectious or contagious diseases can be suspended from work or discharged in order to prevent them from contaminating their fellow-workers, all this having its effect ultimately upon the lost-time rate. Additionally, those who habitually plead slight illness where none exists, doing so in extenuation of frequent one-shift absences, find the excuse of little avail when preferring it regularly to a W.M.R. and usually improve their time-keeping in consequence, this being so, not wholly through fear of the application of disciplinary measures, but largely because of the change in the mental attitude of the malingerers.

To establish in the minds of all the employees the principle that

absence from work calls for subsequent justification, has an influence which is of the greatest importance as shown by its effect on the lost-time rate, but it is imperative that along with it should exist full knowledge that a justifiable reason frankly given will be accepted freely and without the employment of unduly inquisitorial methods. Just as certainly must it be known by them also, however, that discipline will be enforced where it is clearly called for and that repeated unjustifiable absence will lead to dismissal. Unless the W.M.R. obtain the complete confidence of the employees that he will consistently deal sympathetically and justly with them, they will be unwilling to interview him at all, thus causing much friction and nullifying all his efforts, while if the management neglect to take action on the reports of the W.M.R.—after further investigation if necessary in their opinion—the workers will come to regard the whole matter as purely formal and act accordingly.

It should be observed that the foundation principle of this method is that all employees, without exception, shall interview the W.M.R. on the day of their return after every absence unless they were away on special leave. This might seem to raise the question as to whether in carrying out such duties as a matter of routine, a medical man would not be undertaking work of a non-medical nature. Experience demonstrates, however, that medical matters enter so largely and in such unexpected and apparently unlikely ways into the causes of absence that in the vast majority of cases they can be appraised at their proper value only by someone possessing medical knowledge. Apart altogether from the considerations previously alluded to, such as the identification of apparently slight indispositions as being in reality the onset of more serious conditions, advice concerning disabilities, medical treatment needed, the advisability of prolonging convalescence and similar purely medical matters can be adequately dealt with in no other way so easily and satisfactorily.

Special attention will need to be given by the W.M.R. to all re-starting work after accidents, but these employees having been seen by him at regular intervals, if long absent, will usually have had appropriate employment reserved for them where necessary.

Supervision by the W.M.R. of the progress of the injured affords very valuable opportunities for the promotion of that feeling of confidence in him as one anxious to be as helpful as possible which is not merely desirable but actually essential to the success of his work. It is another factor in the reducing of lost-time, of course, tending to prevent certain employees from remaining away from work longer than is necessary, and aids in the furtherance of accident prevention by giving occasion for the W.M.R. to offer

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suitable advice, in certain cases, as to the avoidance of similar accidents in future. This advice supplements the other activities of the W.M.R. devoted to the same end, such as visiting the scenes and assisting a safety committee¹ to investigate the causes of accidents, advising those examined by him before engagement as to special risks, perhaps lecturing occasionally to the employees, and reporting to the management concerning those causes of accidents brought to his notice which arise out of deficiencies of organisation, faults in machinery safeguards or which arise out of unsafe practices, etc.

It will be seen that all functions of the W.M.R. tend to promote the happiness and well-being of the workers and that his work, of necessity, cannot be carried out by others. This alone is sufficient to justify his office but, in addition, the effects upon lost time are such as to render his appointment economically sound, and, indeed, essential. Certain qualifications must be possessed by him, however, of which tact and a recognition of the limitations of his post will be by no means the least important.

Although it is desirable that he should not be engaged in general practice it is preferable that he should have had experience of such work, as in that way a knowledge of working-class home conditions and life will have been acquired.

Appreciation of the difficulties of the employers should be possessed by him no less than a sympathetic understanding of those of the workers, and access to him by all workers wishing to see him should be quite open. In all matters pertaining to health, he ought to be the ready and recognised intermediary between the employers and the workers.

In making reports, he should be required to confine himself to facts, calling the attention of the management to the cases and leaving them to take what steps they consider to be needful. For him to be able to present a case clearly and concisely will prove advantageous in this regard but it is of even greater use when dealing with the employees, because of the frequency of occasions where it is desirable that his advice should be easily understood, with, if possible, the underlying principles made clear.

On no account, it need hardly be said, should he have disciplinary power which should be completely retained in the hands of the management, the duty of the W.M.R. in this connection consisting only in the presenting of reports and there terminating.

Finally, it may be emphasised that the work of the W.M.R. should not be in any way casual or occupy some merely secondary place among other professional work. Even if employed at the

¹ Alternatively, a Technical Suggestions Committee, see p. 258.

works only part-time, he should regard himself as an ordinary member of the staff attending at certain hours which must not be encroached upon by outside obligations and, in short, as subject like the rest of the staff to the usual staff regulations. For him to be allowed to act as someone engaged in other more important pursuits and coming to the works merely to give special advice at irregular intervals will only lead to general dissatisfaction and disappointment.

The all round reduction of hours has cleared the way for a great improvement in the physical well-being and social conditions of the workers, and, given an equitable system of payment by results, a new era of prosperity and development should set in for all parties.

There are many considerations involved in the actual choice of hours and the best contribution to this question that can be offered at the moment is to quote from the Annual Report of the Chief Inspector of Factories for 1918.¹ The Home Office Factory Inspectors are in a unique position for surveying the whole country, and, being disinterested, their consensus of views has a real value.

Hours of Work.

Immediately after the Armistice there was a great revival in several of the principal industries of the demand by the operatives for a considerable reduction in the hours of work. In view of this rapidly growing movement reports were called for showing what schemes of hours were being adopted and with what results.

The reports show that the shortening of hours has been achieved mainly by means of three different systems of work, namely:—

- (1) The one-break day system, under which work commences after breakfast and only one meal time is allowed.
- (2) The two shifts per day system, under which work is carried on by two shifts of workpeople each working from 6 to 8 hours daily.
- (3) The five-day week system, under which no work is done on Saturday.

In many parts of the country the practice of commencing work after breakfast has been in force for many years in certain industries, and this is chiefly so in London in such trades as the manufacture of clothing, boots, jam and sugar confectionery, and in printing and book-binding, probably due to the fact that workers in London have usually to live a long way from their work. During the past year, however, the system has been adopted in numerous works in a wide range of industries throughout the country.

THE ONE-BREAK DAY SYSTEM.

A Gloucester engineering firm whose hours used to be 6 to 6 less 1½ hours for meals changed about 8 years ago to 7 to 12; 1 to 5 30; thereby reducing the net weekly hours from 59 to 53. They state that—

“on the old system 10 per cent. of the workers lost a morning quarter of 2½ hours every week, while now the time lost from all causes, exclusive of sickness, is less than 0.5 per cent. of possible hours. Three minutes grace is allowed at 7 a.m. after which workers are shut out till 1 p.m.

The sickness rate was also considerably greater under the old system.”

¹ Extracts by permission of The Controller of H.M. Stationery Office.

Hours of Work.

In the S.W. Division the Government Dockyards and the Engineering works connected therewith have for many years worked 7 to 12; 1.30 to 5; Sat. 7 to 12.

Both in this Division and in the Midland Division it is stated that several firms allow a brief break of 5 or 10 minutes for a snatch meal during the morning and afternoon spells of work. In some cases workers are allowed to go to the canteen when there is one, and in other cases wagons containing light refreshments are taken through the works.

No case is reported of an engineering establishment once having adopted the one-break day, reverting to the old system, but a firm of Iron foundries in London who reduced their net weekly hours from 54 to 52 by adopting the period from 7.30 to 6 with one break, instead of 6 to 5 with 2 breaks as originally worked, had to revert to the original system because the men objected to the later finish and also because they could not always get breakfast at home before starting. The firm say that during the time they worked the shorter hours there was some loss of output, but that the time-keeping was better.

A firm of agricultural and garden tool manufacturers employing 400 males and 400 females, adopted the one-break day in the *Mill* (cold process) early in 1917, reducing the net weekly hours from 53 to 47 hours 40 mins (reckoned as a 49½ hour week). A small group of men objected to the change when it was first introduced as they said they could not eat their breakfast before working, but apparently they have now got used to it. The system has worked very satisfactorily. In the manager's opinion the chief disadvantage of a single-break-day is the probable failure of some of the workers to obtain a proper breakfast before they come in. He thinks that a good many of his workers depend on what they can eat during the short break at 10 a.m. He is inclined to think that better work would be done if the workers could be persuaded to come in as at present at 8 a.m. and have breakfast in the canteen before commencing work. They could then work to 12.30 without a break, and he is in favour of working two 4-hour spells with no breaks, and hopes to be able to introduce such a system.

A most interesting case is that of a firm in Rossendale, manufacturing on a very large scale various kinds of shippers, shoes and boots. Towards the end of 1917 they reduced their hours from 55½ to 48 per week, and in January of this year they made a further reduction to 46½. In addition to the dinner time a cup of tea is provided free at 10 a.m. and 3 p.m., a break of 7 minutes being allowed to those who work seated, while those in attendance on machines take their snack while at work. The output did not fall off when the hours were reduced from 55½ to 48, and even on the 46½ hour week it has been fairly well maintained. Cost of production remains about the same. Piece work prices have not been altered, and day workers get the same wage for reduced hours as for 55½. At the annual meeting of the company, in December, 1918, the chairman said :—

"Last year I mentioned the fact that the introduction of the 48-hour week had, during the three months it had been in operation, made for efficiency by considerably reducing the number of cases of sickness, more particularly amongst females, and now that we have had a full year's trial we are able to confirm that statement by the fact that less than one-half have had occasion to use the rest room. This decrease of sickness we attribute to working shorter hours and to giving a cup of tea morning and afternoon."

The case of a large match factory is also worthy of note as illustrating the advantage of allowing the short breaks during the morning and afternoon spells, at all events where the spells are as long as five hours. The hours of work are 7 to 12; 1 to 6 with no work on Saturday. Some time ago it was decided to stop all machinery for 10 minutes at 9 a.m. to allow workers to eat food brought with them from home, and in the afternoon to allow workers to go to the canteen for 15 minutes in three detachments, a mug of tea being given free. The wages book shows that the money earned by the workers has increased on the whole since the breaks were commenced, indicating that output has not fallen off. The girls are now in much better spirits towards the end of the spells than they were before the change. As regards the loss of five hours on Saturday the Manager says that the fall in

output due to this has not yet been made up, but he hopes that later on it will be. Hours of Work.

* * * * *

As regards the new system, almost without exception, the employers who have tried it are entirely favourable, but that, while the workers generally approve of it, their opinions are very varied. The chief objections appear to be :—

- (i) that breakfast before starting means increased consumption of coal and gas.
- (ii) that the interval between breakfast and dinner is too long (even where work begins at 8 a.m. the worker must have breakfast as early as 7 a.m. and often much earlier, and the average working man or woman is not likely to have a very substantial meal under the circumstances) unless a short break is allowed during the morning spell or light refreshment is sent round in a wagon as is done in some cases. Where canteens exist at the works the difficulty is easily got over. In several instances the reports show that, owing to the obvious flagging of the workers, particularly women and young persons, during the morning and afternoon spells, it was found necessary to allow short breaks, which in some cases actually led to an increased output.
- (iii) that confusion is caused in the home, and hardships to the housewife, where members of the family are employed at different factories working on different systems—also the housewife has to get up much earlier to prepare breakfast. Under the old system any hot drink or food that was required by the early workers was prepared by themselves.

The Superintending Inspector in Scotland calls attention to two manifest advantages in the new system which are not generally recognised, namely, that the workrooms are more comfortable, particularly in winter when they can be properly warmed before work commences, and that the workpeople get more sleep. He also points out that in industrial centres the hour at which people go to bed is very much later than it used to be because now there are more evening amusements to keep them up.

THE TWO-SHIFTS-PER-DAY SYSTEM.

This system consists in *two* day-shifts of 6 to 8 hours each, usually between 6 a.m. and 10 p.m. Generally the second shift takes over from the first without any break, but sometimes there is a short interval between, and, where this can be arranged, it has the advantage of giving some opportunity for airing the work-rooms, adjusting the machines, etc., and reduces the risk of a person working through from first shift to the second.

* * * * *

The following general lines have been followed in dealing with applications for Emergency Orders authorising the employment of women and young persons on the two-shift system.

- (a) In no case has employment before 6 a.m. been allowed and employment after 10 p.m. only in a few exceptional cases, *e.g.*, where the workers live in close proximity to the factory or the travelling facilities are unusually good. These are mostly cases in which the workers have been used to starting at 7 or 8 a.m. and prefer to continue this and work late on the second shift rather than start on the first shift at 6 a.m. so as to finish the second shift by 10 p.m.
- (b) Employment of girls between 14 and 16 in the late shift has only been allowed in special cases where they form an essential link in the chain of work and it would have dislocated the shift to exclude them; and only in respect of such girls as live in close proximity to the factory. In some cases (*e.g.*, of rather isolated factories) a higher age limit than 16 has been fixed for girls, and boys under 16 have been excluded.
- (c) Employment after 2 p.m. on Saturday has only been allowed in a few cases, and then only for a short period to give firms time to reorganise without it.

Hours of Work.

- (d) Long spells of work before breakfast, e.g., 6 a.m. to 9.30 or 10 a.m. on a 6 a.m. to 2 p.m. shift, have been disallowed unless a works canteen is provided and kept open for the workers to get refreshment before or within an hour or so after starting work. Usually a breakfast interval of 8.30 to 9 or 9 to 9.30 has been fixed, and in some cases a still earlier interval with either a second short break about midday; or a shorter shift ending at 1 or 1.30 p.m.

In some cases unequal shifts, e.g., 6 a.m. to 1.30 p.m. and 1.30 p.m. to 10 p.m. are better than two equal shifts 6 to 2 and 2 to 10. The change over at 1.30 shortens the long spell of work after an early breakfast interval and enables the women to get home before the family dinner time is over. And assuming, as is usually the case, that the second shift does not work on Saturday, the change over at 1.30 p.m. instead of 2 p.m. nearly equalises the weekly hours as between the two shifts. Shift I, 7 hours (net) on 6 days = 42 hours net. Shift II, 8 hours (net) on 5 days = 40 hours net. With equal 8-hour shifts, Shift I, $7\frac{1}{2}$ hours (net) on 6 days = 45 hours net. Shift II, $7\frac{1}{2}$ hours (net) on 5 days = 37 $\frac{1}{2}$ hours net.

- (e) In all cases it has been made a condition of the Order that the occupier shall provide adequate facilities for workers who remain on the premises during the intervals (as with a short interval most workers have to do) to obtain meals at the works.

The Inspectors report that in very few cases have any objections been raised by the work-people, but that, on the contrary, those questioned at several factories have expressed themselves well pleased with the system. They also report that no particular administrative difficulties have been experienced. The schemes of hours in vogue vary widely in arrangement, but in the majority of cases the scheme in operation is, Shift I, Monday to Friday, 6 a.m. to 1.30 or 2 p.m., and Saturdays, 6 to 12, 1, 1.30 or 2, with half an hour for breakfast some time between 8 and 9.30. Shift II, Monday to Friday, 1.30 or 2 to 10 p.m. with half an hour for a meal about 5 p.m. and no work on Saturday. In a few isolated cases, however, the second shift either works the usual hours on Saturday or comes in early and overlaps with the first shift. In some works it has been found advantageous to allow a short break of 10 or 15 minutes morning and afternoon, in addition to the regular meal time. In some cases work ceases at 8 or 9 p.m. (in two cases as early as 7.30). In a chocolate factory working 6 to 1 and 1 to 8 the scheme is said to be very satisfactory to both employers and workpeople: the output is at least 50 per cent. greater than when the previous hours (9 a.m. to 7 p.m.) were worked. Several workers told the Inspector that they much preferred the two-shift system and were better in health in consequence of the change. In other works where men used to be employed systematically on overtime the adoption of the two-shift system was much appreciated because it put an end to overtime.

The arguments advanced in favour of the system may perhaps be summarised as follows:—

- (1) It increases the volume of available employment which at the present time is most urgently necessary—particularly in the case of women. In several cases the adoption of the system has enabled a firm on ceasing war contracts to avoid discharging numbers of its workers, to absorb its demobilised men without discharging other workers, or to take on numbers of women discharged from neighbouring munition factories.
- (2) It affords a means of increasing the total national production which is essential to the restoration and maintenance of the national prosperity.
- (3) At the same time it decreases the cost of production.
- (4) It obviates overtime.

THE FIVE-DAY WEEK SYSTEM.

Individual works in a fairly wide range of industries have found it convenient to adopt a five day week with no work on Saturday. In the jute industry in Scotland, when it became necessary to shorten hours the work-people demanded that no work be done on Saturday, but otherwise the system has not been adopted throughout any industry and there are no signs at

present that it is likely to be very attractive generally either to employers or workpeople. Generally speaking 5 days of practically equal periods of employment have been adopted, but in some cases the hours have been arranged so that one period is worked on 3 days while another, usually a shorter period, is worked on the remaining 2 days. In the large majority of works a 10 or 11-hour period is worked on the longest days, in which case $1\frac{1}{2}$ hours are usually allowed for meals, unless the starting hour is at 7 a.m. or later, when it is convenient to allow one break only (varying in different works from $\frac{1}{2}$ of an hour to $1\frac{1}{2}$ hours). In Scotland where two full meal hours have always been customary in certain industries a 12-hour period was usual on each of the 5 days.

At one large textile factory where the five-day week was tried for some time the output fell off so much that the firm adopted a six-day week with an after breakfast start at 8 a.m. and one meal hour, with the result that, notwithstanding shorter weekly hours, the output increased again.

Fatigue is a subject which makes a direct appeal to the physiologist, and the scientific investigations that were made during the war under the direction of the Ministry of Munitions, go to, confirm the advantage to be derived from shorter hours. The investigations necessarily involved the whole field of the physical efficiency of the worker and the Final Report of the Health of Munition Workers Committee, issued in April 1918, from which extracts are given below, constitute a valuable survey of the position.

Fatigue and
Health.

*Industrial Health and Efficiency.*¹

PRELIMINARY AND HISTORICAL SURVEY.

This Report of the Committee's work, though concerned primarily with the munition worker, deals also with vital principles and practical methods affecting all forms of industry. Moreover, the health of the industrial worker—man and woman—is but part, essential, plastic, living, of the health of the people as a whole, which in its turn raises manifold problems of administration, economics, social relationships and even ethics, which though apparently remote from questions of medicine, are, in truth, intimately associated. It is found that some of the most intricate problems of health and physical efficiency are inseparable from large issues of physiology, of social relationship or morals, and of human conduct.

Physical health is the fundamental basis. There must be a proper distribution of function of labour, a correct understanding of the part played by nutrition, by rest, by fatigue, by health conditions, if waste is to be avoided and maximum energy attained.

The modern Factory Acts were only gradually evolved; legislation was directed to removing particular evils as they became recognised, rather than to the realisation of definite principles, based on a critical examination of the causes of the evils. For upwards of a century the State has accumulated indisputable evidence that it is the conditions of employment rather than its character which undermine the physical strength and endurance of the worker. Apart from exceptional occupations which are in themselves injurious, the principal of the undesirable conditions, the most radical and persistent, the commonest, is that of *long hours*. It is a significant fact that all through the history of the industrial system of this country the dominant evil is not accidents or poisoning or specific disease, but the stress and fatigue due to long and unsuitable hours of labour, entailing inadequate opportunities for rest, recreation and nourishment. In a word, it is not the work but the continuity of the work which kills.

p. 192.

¹ Extracts from Government Final Report [Cd. 9065], by permission of the Controller of H.M. Stationery Office.

Fatigue and Health.

In this gradual development of opinion as to what is needful to secure the well-being and efficiency of the worker, the factory inspectors have played an important part; though primarily concerned with the enforcement of the law, they have inevitably developed a wider view of their responsibilities. Since the first appointment of women inspectors, in itself a significant fact, this movement has been increasingly valuable, and the Annual Reports of the Chief Inspector contain constant evidence of the interest shown in such matters as the provision of washing facilities, baths, cloakrooms, overalls, canteens and messrooms.

The Committee wish to point out that in spite of the great progress which had been made it remains true that up to 1914 relatively little attention had been paid by employers and others responsible to the steadily accumulating evidence of the influence of occupation upon health, and but little effort had been made scientifically to investigate its causes. Efforts to protect the health of industrial workers had been mainly based on the need of mitigating or removing admitted evils as they arose, rather than on the actual results of scientific inquiry and research. No doubt, partly as a result of the appointment of medical inspectors by the Home Office, increasing attention had in recent years been devoted to the critical examination of certain "dangerous" trades; but most trades are not "dangerous," and the vast bulk of industrial disease did not find its origin in dangerous trades. Yet there is the strongest evidence that rates of sickness and mortality amongst males had been materially affected by occupation.

In the Committee's view it is necessary to make arrangements, without delay, for a national scheme of industrial medical research, and to accord fuller recognition to the importance of industrial hygiene.

RELATION OF FATIGUE AND ILL-HEALTH TO INDUSTRIAL EFFICIENCY.

Fatigue is the sum of the results of activity which show themselves in a diminished capacity for doing work.—In ordinary experience fatigue is generally associated with familiar bodily sensations and these sensations are often taken to be its measure. It is of vital importance for the proper study of industrial fatigue, however, to recognise not only that bodily sensations are a fallacious guide to the true state of fatigue which may be present, and a wholly inadequate measure of it, but also that fatigue in its true meaning advances progressively, and must be measurable at any stage by a diminished capacity for work, before its signs appear plainly, or at all, in sensation.

Fatigue of the animal machine is not to be compared with the failure of fuel as in a steam engine, or with the running-down of a clock weight, but rather with the clogging of the wheels in some mechanism by dirt.

The chemical products of activity in the nervous and muscular elements are removed by the blood, in part directly by irrigation and in part indirectly through chemical changes in the tissue itself produced by constituents of the blood. Rest after activity is not a passive state, therefore, but is itself an active process, or a series of active processes, leading to a restoration of the normal capacity for work. Time is required for these, and the time taken will be in proportion to the amount of restoration needed. There will be a definite relation accordingly between the degree of any given activity and the time necessary for the completion of the subsequent restoration process. If the activity is repeated too quickly to give time enough for restoration after each action, fatigue will become progressively more intense as the debit balance accumulates, and each repeated act in consequence will be more and more impeded, and will become smaller, until further action is impossible.

The problems then of industrial fatigue are primarily and almost wholly problems of fatigue in the nervous system and of its direct and indirect effects.

The problem of scientific industrial management, dealing as it must with the human machine, is fundamentally a problem in individual capacity, physical and mental, and in industrial fatigue. The rhythms of industrial conditions required by the hours of labour, the pace of machinery or that of fellow-workers, or otherwise, are imposed upon the acting bodily mechanism from outside. If these industrial rhythms are faster than the natural rhythms of the body they must produce accumulated fatigue, and cause an increasing

debit, shown in a diminished capacity for work. It is therefore the problem of scientific management to discover in the interests of output and of the maintained health of the workers what are the "maximal efficiency rhythms" for the various parts and faculties of the human machine. These must be determined by the organised collection of experience or by direct experiment. They must be separately determined, moreover, not only for the performance of relatively simple muscular movements, all of which depend on the action of "lower" nervous centres, but also for the manifold faculties of the various systems of the body, and for the "higher" co-ordinating centres, and for all of these the natural rhythms must be studied for the best arrangement of industry, the hours, shifts, spells, pauses, the periods of sleep and holiday on the one hand, and the conditions of factory environment on the other.

For practical purposes in industrial management two chief characteristics of nervous fatigue must be observed. First, during the continued performance of work the objective results of nervous fatigue precede in their onset the subjective symptoms of fatigue. Without obvious sign and without his knowing it himself, a man's capacity for work may diminish owing to his unrecognised fatigue. His time beyond a certain point then begins to be uneconomically spent, and it is for scientific management to determine this point, and to determine further the arrangement of periods of rest in relation to spells of work or other body or environmental conditions that will give the best development over the day and the year of the worker's capacity. Second, the results of fatigue which advances beyond physiological limits ("over-strain") not only reduce capacity at the moment, but do physical or mental damage of a more permanent kind which will affect capacity for periods far beyond the next normal period of rest. It will plainly be uneconomical to allow this damage to be done.

Measurements of output must obviously be recorded at so much for each individual or for each unit group. The size of total output will be meaningless of course without reference to the numbers engaged. But it will also be important for proper management to take account of the output of particular individuals. This in many factory processes is easily possible, and when it has been done the results have shown surprising variations of individual output which are independent of personal willingness and industry, and have generally been quite unsuspected by the workers and their supervisors before the test was made. Information so gained is valuable in two respects. Good individual output is often the result of escape from fatigue by conscious or unconscious adoption of particular habits of manipulation or of rhythm. Its discovery allows the propagation of good method among the other workers. In the second place, these tests of individual capacity (or its loss by fatigue) give an opportunity for a rearrangement of workers and their assignment to particular and appropriate processes of work. Astonishing results, bringing advantage both to employer and employed, have been gained in this and other countries by the careful selection of individuals for particular tasks, based not upon the impressions of foremen but upon the results of experiment.

It is not too much perhaps to hope that the study of industrial fatigue and the science of management based upon it, which is now being forced into notice by immediate need, may leave lasting results to benefit the industries of the country during succeeding years of peace.

It must be remembered that when fatigue passes beyond physiological limits ("over-strain") it becomes ill-health, which leads not only to reduced output but to more or less serious damage of body or mind. There is also, of course, much industrial sickness and disease which bears no exact relation to fatigue, though it may follow or precede it.

It is certain that unless industrial life is to be guided in the future—(i) by the application of physiological science to the details of its management, and (ii) by a proper and practical regard for the health and well-being of our workpeople in the form both of humanising industry and improving the environment, the nation cannot hope to maintain its position hereafter among some of its foreign rivals, who already in that respect have gained a present advantage.

Works Hygiene.

p. 73.
p. 193.
p. 257.

The methods of ventilation, heating, lighting and the like, pertaining to the establishment of a high standard of works hygiene are essentially technical and such reference as is convenient in this book is made under buildings and plant in Section II A. Undoubtedly there lies in this direction room for much improvement in the majority of factories, benefiting the employer monetarily and the worker physically and monetarily as well if he is paid in any sense on results.

Accident Prevention.

p. 195.
p. 256.

The question of accident prevention covers a wide field, owing to the differences in the character of the risks in the various trades and again, the differences of conditions in the various factories within the same trade. The full treatment the subject deserves cannot possibly be given here but the Annual Report of the Chief Inspector of Factories for 1918¹ can again be drawn on to give an authoritative review of the position generally and the following extracts are given accordingly.

Accident Prevention.

Questions relating to safety in our factories and workshops certainly claim a large measure of attention, and an examination of the return of accidents reported to the Factory Department during the year makes it abundantly clear that there is still much room for improvement. Notices were received of 1,579 fatal cases, of 53,491 accidents due to machinery, and of 108,663 non-machinery cases. These figures are not quoted for any purpose of comparison with those of former years; no fair comparison would, in fact, be possible, since the conditions during the war have been quite abnormal both as regards the nature of the work performed, and the type of labour performing it. They are quoted rather to bring home the extent of the problem to be dealt with. They are figures which no one can contemplate with equanimity, for they represent an enormous economic loss to the nation, to industry, and to the workers themselves. It is, therefore, of the first importance to all, more particularly having regard to the ravages of the war on the manpower of the country, that so great a cause of waste and loss of efficiency in our industrial organisation should be as far as possible removed. More than this it is a simple duty owing to those who give their labour, that the conditions under which they work should be rendered as safe and secure as practicable.

A solution of the problem is not to be found merely in a more strict observance of an Act of Parliament; much will depend upon the attitude adopted by those immediately concerned. There must be a determination by both employer and worker to bring about a reduction of accidents, each in his own individual trade, and in his own individual factory, and there must be active co-operation between them, if satisfactory results are to be obtained. Happily the general tendency is towards such joint consideration of problems affecting industry, and there is every reason to hope that the good results which have followed from a joint discussion of other problems may equally ensue from joint action in regard to accidents.

Accidents may conveniently be divided under two headings.

- (1) Machinery accidents and those preventable by safeguards, and
- (2) non-machinery accidents, and accidents not due to want of fencing.

¹ Extracts by permission of The Controller of H.M. Stationery Office.

ACCIDENTS PREVENTABLE BY SAFEGUARDS.

Accident
Prevention.

The Factory Department has always given a large amount of attention to the fencing of machinery, and to the provision of safeguards against accidents. The wide experience gained by the inspectors in the exercise of their duties, and the administrative action which they have taken has enabled them to effect great improvements in the fencing of machinery generally. But important results have been obtained, too, through statutory regulations, or through agreements reached after conference with representatives of different industries, and it is by an extension of these that further progress in regard to fencing of machinery is most likely to be made. The great advantages which must follow from such procedure are obvious, and most important of all is the fact that under such regulations or agreements the precautions required are at once standardised and the designers and manufacturers of the machinery are led to construct their machines with all the necessary safeguards attached.

Trade Agreements.—Similarly, a marked advance in the protection of machinery was accomplished shortly before the war, by means of agreements which were reached in consultation with representatives of employers and operatives in the cotton trade, the woollen trade, in bleaching and dyeing and in the tin-plate trade. Under these a clear understanding was reached as to what parts of each machine were to be considered dangerous, and in some cases (*e.g.*, as regards the fencing to be provided for draw-bands and pulleys and scrolls of self-acting mules in the cotton trade) the actual form of the guard was standardised

Arrangements are also being made for a further extension of the work of the Department on these lines, and a special opportunity for doing this is afforded by the formation of Industrial Councils under the Whitley scheme.

In the case of the building trade a special sub-committee of the Council is already at work, considering the fencing of wood-working machinery. It may be hoped that gradually other Councils will similarly take the question of fencing of machinery into consideration. A great work would be accomplished, if trade by trade, the fencing of machinery could be standardised. The hands of the Inspectors would be strengthened enormously thereby, and the opposition which they now too frequently meet with would largely be removed.

NON-MACHINERY ACCIDENTS, AND ACCIDENTS NOT DUE TO
ABSENCE OF SAFEGUARDS.

Whatever may be accomplished by the provision of more adequate safeguards, it must not be overlooked that the reduction of accidents to be effected by this means can only represent a very small proportion of the whole. The Inspectors without the assistance of Regulations or agreements have already done much to raise the standard of fencing, and it is necessary to recognise the fact that two-thirds of the accidents reported were not due to machinery at all. It should be pointed out, moreover, as regards machinery accidents, that it has been the experience of the Inspectors that, even in these cases, not more than 35 per cent. have been due to the absence of a guard, the remainder being attributed largely to such causes as negligence, carelessness, want of thought, and perhaps more than all to lack of proper appreciation of the danger.

"In going over the numbers of notices received every week by a District Inspector, it is evident that a large number of accidents might be prevented by more care and forethought. In speaking to workers on the subject I have noticed that at any rate three different attitudes of mind may be distinguished with which a safety-first campaign would have to deal. First, the workers in many cases believe little in the value of the guard as a preventive of accidents in their own work. Secondly, even when its efficiency in this respect is more or less believed in, it may be regarded as a sign of timorousness to use it. A real spirit of bravery in disdaining to think too much of personal safety is sometimes included in this, and for that reason it requires careful handling of an educative kind. Thirdly, and unfortunately very frequently, there is simple negligence in using guards provided or employing safety processes and methods advocated."

**Accident
Prevention.**

"There is a great scope for a safety-first campaign in factories. A very large number of accidents occur through the neglect of simple precautions on the part of workers, which is often due to want of training, defective organisation, or the absence of discipline in the factory. Probably more accidents are attributable to these causes than to direct breach of any requirement of the Acts."

It has to be admitted, then, that large numbers of accidents occur quite necessarily, that there is thus an avoidable loss of industrial efficiency, that in the interests of all concerned steps ought to be taken to bring about a reduction of such cases. By what means can this be accomplished? In some cases in which the Factory Inspector can play but a small part, a real reduction is to take place, it can be effected only by the joint effort of employers and workers in each individual trade and factory. The remedy, however, is undoubtedly to be found in a wide extension of the system of safety committees, which have been attended by so much success in the cases where they have been tried.

They have the important duty of keeping the question of "safety" prominently before the work-people. For this purpose they should from time to time issue notices and warnings together with a set of general safety rules which should be exhibited in prominent positions in the works. Notices calling attention to danger are commonly found in factories, but they are too frequently careless.

"There is one point about most cautionary notices which is distinctly bad. They are printed in black ink on white paper, and without any striking or characteristic feature in their arrangement or wording, and, further, too much is embodied in one notice."

It is of value the notices must arrest attention, and they should be changed from time to time.

* * * * *

A careful selection is necessary, too, of the places where such notices are to be affixed. They must be placed in conspicuous positions where they will be in the eye, and the following are examples of notices which are painted on the girders of a works in Wolverhampton :—

A CLEAN MACHINE WORKS EASIER.

DON'T UNDER ANY CIRCUMSTANCES WORK A MACHINE WITH A GUARD OFF.

DO NOT WALK UNDER THE LOAD.

REPORT ALL INJURIES, HOWEVER SMALL, IMMEDIATELY.

DO NOT INTERFERE WITH ANY ELECTRICAL EQUIPMENT.

Another interesting case is reported where the notice becomes visible only when the guard is removed, thus calling attention to the absence of the guard, and the consequent danger. It has the further merit that as the notice is not visible when the guard is in place, it does not lose its value as a warning through being always in evidence.

Yet another duty which should be undertaken by safety committees is the consideration of safer methods of working, and they should encourage suggestions to this end through a *suggestion box* or otherwise. The possibility of a more extended use of jigs, of automatic and safety feeds, and of special signalling arrangements are the sort of points which should be considered.

* * * * *

Accident Analysis. It is evident that if accidents are to be prevented full knowledge is necessary as to how and where they occur. This can only be acquired by a full and careful analysis of all the accident reports. It is not sufficient to know that accidents have occurred in such and such a department or on such and such a machine. It is necessary to get down to much closer detail, and to examine precisely in what manner the accident occurred, and precisely by what portion of the machine it was caused. Accidents tabulated on these lines will at once show which are the danger zones, and what are the exact dangers to be guarded against.

An instance may be usefully quoted of a safety committee, acting in collaboration with the works medical referee, to which reference

is made on page 218. The committee was called the technical suggestions committee and consisted primarily of highly skilled mechanics and foremen. Accident statistics were reviewed and recommendation made to the management as to steps that might be taken to prevent recurrence, and safer methods of working were also considered, apart from actual accident occurring. The analysis of accidents adopted in this case was as follows :—

Accident
Prevention.
p. 54.
p. 255.

1. Steel in eye from work or tool whilst operating	8. Hernia through strain
2. Foreign matter in eyes whilst grinding tools	9. Electric shock
3. Burns on body due to hot steel from furnaces	10. Minor wounds, cuts, etc., from sharp edges of work and tools
4. Burns due to hot chips and splinters	11. Wounds reported septic due to steel or copper splinters, etc.
5. Wounds due to being caught and jammed in moving chains, belts, or machinery	12. Miscellaneous
6. Crushed limbs and bruises caused by falling weights	Total number of casualty cases
7. Strain due to lifting, pulling, etc.	Fatal accident
	Total number of men working
	Percentage of casualties to numbers working

Very encouraging results were obtained in the reduction of accidents. Suggestions for labour saving and other technical improvements were invited from the workers, but no marked progress was made in that direction.

The organisation necessary to adequate treatment of accidents is indicated in the specimen works regulation given on page 255 under that head and this embodies a very successful experience. One trained nurse dealt with the needs of about 2,000 workers on each shift (day and night). The nurses were supplied through an agency to ensure unbroken service. It proved cheaper and far more efficient than employing first aid men attendants for the men workers, who comprised the great majority at the particular works in question, where the liability to accident was serious.

Accident
Treatment.
p. 54.

The possible relation of the works medical reference to the treatment of accidents is discussed on page 214.

It is of importance from the point of view of minimising the effect of accidents, and assisting in their prevention, apart from obviating disputes as to liabilities, to encourage the treatment of all accidents, however seemingly trivial, at the works casualty station or ambulance room. A complete log should be kept of all cases attended to by the casualty nurses.

If absence results, the time office can readily make up a complete report with the casualty log book as a basis and making reference to the foreman concerned.

A brief notice of the more serious accidents should be conveyed to the works manager with the least possible delay.

**Accident
Treatment.**

It is doubtful if the Home Office regulations as to having first-aid boxes scattered about the works is as sound in principle as having an efficient casualty station reasonably accessible to the shops.

In the design for a labour administration building given on page 76 provision is included for a central casualty station.

III E

PRINCIPLES OF REMUNERATION

THE general principles of remuneration may be considered to **General Principles.** fall under the following main heads :—

TIME WAGES—under which payment is made on the basis of time attended, plus overtime allowances.

INDIVIDUAL PAYMENT BY RESULTS—under which, through the medium of piecework, premium or other bonus system, *extra pay* is paid over and above time wages, according to the individual output—subject to acceptability in point of quality. p. 128.

COLLECTIVE PAYMENT BY RESULTS—under which the employees in a department or whole works are paid *extra pay* over and above time wages, according to the total output of the department or works. Not uncommonly the output is taken in terms of the finished product actually delivered to warehouse ready for sale. p. 135.
p. 163.

This principle has application to auxiliary service which is not readily measured in terms of individual output. Such work is therefore usually done as time work. It is possible to apply the collective principle to such time workers while retaining the individual principle to a large degree. p. 234.

PROFIT SHARING—under which the worker is given in effect the privileges of a shareholder, without the risks, and derives a proportionate share of any profits, in addition to his earnings under a time wages or payment by results system. It is, in a sense, a system of payment by results but is not the direct reflex of production efficiency in point of volume and cost, in view of the commercial factors entering into the question after production is completed. As a scheme, it tends to engender an *esprit de corps* which may be expected to show itself in more interest being taken in the work. It promotes recognition of the sense of common interest of employer and employed in production efficiency, though as an immediate incentive to output, the reward is too problematical to be effective.

General Principles.

CO-PARTNERSHIP.—This is a system of profit-sharing restricted to those workers who actually take up share holdings by the payment of cash. By the offer of favourable terms, it may constitute a valuable privilege and attach individuals permanently to a firm to their mutual advantage. It is, however, hardly a form of remuneration and might even be compared almost with the provision of exceptionally favourable housing accommodation.

These principles may be said to be conditional on the continuation of the capitalist system, which is being attacked by certain extreme schools of thought. The following very briefly indicates the main alternative proposals for the control of industry :—

NATIONALISATION.—means ownership and entire control by the State. The community in other words has to finance the respective industries and take the risk of efficiency being attainable under Civil Service control, in one form or other.

GUILD SOCIALISM.—The advocates of this method of control would have the State own the means of production as trustees for the community and for each industry a Guild, composed of the manual workers and the brain workers engaged in that industry, would manage the respective industries also as trustees for the community.

SYNDICALISM.—aims at the ownership of the means of production not by the State but by the workers in each industry—this ownership to be obtained by confiscation or at the expense of the State.

It is not necessary here to go into the merits or demerits of capitalism or nationalisation or any other form of control. All these systems are subject to the same economic laws, and industry cannot continue except it be solvent, that is, pay its way. To maintain solvency there must be production efficiency—as to the standard of efficiency necessary to continued existence, international competition is the final test. Just as a consumptive may be able to prolong his life under selected conditions and climate, so industry may seem to flourish, although sick, while exceptionally favourable conditions exist, such as the world hunger for goods after the world war. As that first hunger gets satisfied by the effort of all the nations that are able to produce, whether efficiently or not, then the stress of competition will set up harsher conditions and only the healthier industries will be strong enough to meet them. With the rapid recuperation possible under modern conditions of production, a year or two may easily see the beginning of more difficult times.

If it can be accepted that production efficiency is the measure of an industry's health, then the remuneration of those engaged

therein is based on sound principles only when it unfailingly makes for the attainment of that efficiency. To take this stand is not to ignore that remuneration is not the only means of incentive to efficiency. A hardly less important factor is that of goodwill, of co-ordination between Labour and Management. Goodwill can be permanently founded only on equity, involving many factors and not all of them within the control of Management, such as housing conditions.

General Principles.

The working conditions making for health, safety and free mental development of the workers are recognised to-day as vital factors but there is no denying that the greatest factor still remains in the establishment of an equitable system of remuneration. High time wages may seem to the worker to be the obvious channel of equitable remuneration, as he looks at it, but without high time wages connote correspondingly high production efficiency, then the arrangement is not equitable in that the worker is draining the capital of the concern¹ which must inevitably come to grief, to the detriment of the worker equally of the capitalist; and perhaps the worker's penalty is likely to be the heavier and more quickly affect his bread and butter.

If under the time wage system, the supervision has to be so intensified that only those workers are tolerated who do reach the requisite standard of efficiency, then the selected workers may be continued in well paid employment without seemingly being paid by results. In effect, if dismissal is the consequence of failure to give good results, or results appropriate to the high time wages paid, then even the time worker is paid in a negative sense by results, while at the same time he is debarred from those high earnings that a system of payment by results would make possible in giving him an incentive to effort beyond that necessary for merely holding his job.

While there may be room for improvement in the distribution of the profit of industry, there is no doubt that without a profit is made a business becomes insolvent and must close down.

A system of direct payment by results can be so founded as to be on the one hand an ever watchful guard against insolvency and on the other hand afford to each worker the opportunity of higher earnings without the stability of the business being endangered. A wrongly founded system may, however, serve to give only higher earnings to the worker temporarily and while the business lasts. It may ultimately bring down the business to the ground.

¹ Or the State, under Nationalisation.

Time Wages. As a principle of remuneration, time wages need no explanation. In the ordinary way, time wages consist of two elements, the wages for the time of attendance at the agreed time rate per hour and an additional overtime allowance, on an agreed scale, in respect to those hours of attendance additional to the normal hours of work. These rates and allowances are the subject of agreement between Trades Unions and Employers Federations in the various trades or in certain unorganised trades subject to the ruling of a Trade Board, appointed by the Ministry of Labour under the Trade Boards Act 1918. Both workers and employers are represented on these Boards.

Payment by Results.
p. 128.
p. 135.
p. 211.
p. 251.
p. 364.

The consideration given to this matter under Production Estimating in Section II D, to individual and collective systems, leave relatively little to be discussed here.

There is a good deal to be said for combining the individual system with the collective system by applying the individual system to the fullest extent possible in any works and then paying a bonus under a collective system to the time workers who have to be left outside the individual system, whether piecework or premium. The point is to recognise and give scope for individual merit to the utmost and then by taking the resultant total efficiency of the piece or premium workers and the time workers considered together, to pay the time worker accordingly. This means that the greater the efficiency of the piece or premium workers, the better the net result and the higher the time worker's bonus. Instead of the time worker being jealous of the piece or premium worker, he benefits by the latter's efforts as expressed in output. This system was tried with marked success during the war, to meet the inequitable conditions of skilled men being necessarily on time work while the lesser skilled men were on highly profitable piece work in the same works.

In attempting such a scheme, it is all important that the standard of total efficiency be controlled by the selling wages element per unit of product. That is to say, in building up the selling price for a given product, the amount of wages provided for must not be exceeded in distributing any collective bonus whether in association with an individual system or not. This "selling wages element" must be computed to include direct wages together with secondary and auxiliary or indirect wages in view of the earnings of all the workers being involved. Obviously under such a system, each calculation of the collective bonus would give an absolute measure of production efficiency for the respective periods so far as labour costs were concerned. Questions of material wastage would have to be brought into account also.

If to the "selling wages element" were added an agreed share of the profit provided for in the net selling price, then the distribution of the collective bonus would be a reasonable sharing of those profits which Labour may be considered most entitled to share. It is profit sharing in advance carried out literally and is only thinkable under a well constructed and efficient system of administrative records and cost accounts. At the same time, no collective any more than an individual system of payment by results can be counted as achieving efficiency without it meets the test of total production costs per unit of product against net selling price.

Payment by
Results.

III F

SELECTION AND TRAINING OF WORKERS

**Classes of
Workers.**

THERE are broadly three classes of adult men workers to be considered.

Skilled Craftsmen or Mechanics.

Semi-skilled workers—for the most part machine minders and certain grades of hand workers, such as fitters' mates, beltmen, navvies, etc.

Unskilled workers—general labouring.

In the absence of mass production conditions before the war, many skilled craftsmen in engineering did work of a relatively unskilled nature because the quantities involved made it convenient for the mechanics to perform every operation on a given piece of work. On the other hand, in some districts, lesser skilled men, such as drillers, were recognised as distinct from craftsmen proper, and in no sense competitive with them.

The enormous output required to meet war requirements not only made possible but practically compelled sub-division of labour. These circumstances taught the nation that the craftsmanship involved in producing a complete article throughout was not equally necessary when each step or operation was dealt with separately with all the aids that specialisation made possible. This brought about what was called dilution, but the dilutees were only permitted by the craft unions under duress of war and, so far as engineering and woodworking is concerned, have had to withdraw. The craft unions in their desire to protect the employment of their members have taken too narrow a view of what constitutes craftsmanship and craftsmen are content to do work that often falls far short of being skilled. With industry more efficiently organised on mass production lines, the scope for the larger employment of lesser skilled labour would reduce the cost of production to the advantage of the community generally and would create a demand for skilled craftsmen as machine setters, toolmakers and millwrights or fitters.

If the lesser skilled workers are to have the incentive provided by payment by results so as to ensure the success of a mass production policy then the skilled craftsman necessary to that attainment must be remunerated in some proportionate way. Although the skilled man does not relish strictly repetition work for himself, he is not prepared to make it possible for a lesser skilled worker to earn more money on that repetition work than he can on time work. An important principle of remuneration is involved in this and some collective system of payment by results for the skilled time workers is practically imperative if there is to be equity. This question is further discussed on page 234.

Classes of
Workers.

As bearing on the question of utilising semi-skilled labour it is of interest to put on record the terms of an agreement, reached in connection with gun manufacture during the war, that, while it only had local application between one unfederated firm and the trade unions concerned, the principles involved are of wider importance.

p. 204.

Dilution Scheme.

1. Semi-skilled labour shall be employed on any gun manufacturing operation at the discretion and decision of the Management.
2. The following work shall be deemed to be "semi-skilled":
 - (a) Rough machining
 - (b) Finish machining to coarse limits.
 - (c) Finish machining with the aid of a former or copier.
 - (d) Fitting or filing to coarse limits
3. All operations requiring machining or fitting to fine limits in vogue in gun manufacture shall be deemed to be "skilled".
4. Semi-skilled operators employed on "skilled" operations shall be paid as a minimum the skilled rate of the district. The conditions as to overtime allowances, timeworkers' bonus and piecework rates, shall be the same as obtain with skilled labour in the Gun Shop of these Works.
5. In the event of any difference arising regarding the classification of work as to whether it is skilled or semi-skilled, the Management will receive a deputation from the "skilled" panel of the Works Co-ordination Committee on behalf of the men actually concerned. In the event of no settlement being arrived at, the management will then receive the District Delegate and/or District Committee of the Trade Union affected within three days, the foregoing meetings to be by appointment. In the event of a question not being settled as arranged above, the procedure laid down in part I of the Munitions of War Act 1915 shall be followed.
6. These conditions shall apply to both men and women.

So far as the selection of skilled workers is concerned, the craft unions aim to place their members in employment and a common procedure has been for the shop foreman to get word passed through one of his men to the trade union local lodge as to any vacancies, or alternatively to get his good men to recommend other good men.

Selection of
Workers.

With the development of the Employment Exchange, there is no reason why the trade unions should not work through the Exchange so as to enable the latter to act as a more rapid clearing house

**Selection of
Workers.**

still for labour. With the tremendous growth of trade unionism, there is not the need to-day for the trade unions to seek a reputation as the best medium for finding employment and the machinery provided by the State should be utilised by all grades of workers and by all employers. To make this claim is to seem to overlook the inefficiencies of the Employment Exchange system where all action hinges on paper records and personal judgment is rarely brought to bear. The point is either that the Employment Exchanges must justify their existence by getting past the wooden image stage or be brought to an end. The Advisory Committees formed in connection with the various exchanges claim to have gone a long way in some instances to correct matters.

The community have to pay for Employment Exchanges and must not be content with their being little more than clearing houses for national insurance cards and unemployment pay. There must be insistence on efficient service to the worker and the employer in the large field of employment.

There should be such skill shown and trouble taken to fit the candidates to the employment available and *vice versa* that both sides will suffer a minimum of delay and both be suited.

It is necessary of course to have a clear understanding with the local Employment Exchange that workers who have been in the firm's employ previously should not be sent forward as applicants except after reference in each instance by telephone.

The final selection of workers must necessarily rest with the employers, but the practice of the Exchange sending a haphazard contingent of half a dozen applicants for any vacancy offered is very poor service and only slightly removed from the old time practice of applicants collecting at the works gates.

A system adopted at one works during the War that came nearer F 147. to getting efficient service was to issue a request on the local exchange for each worker required. The scheme only partially applied to skilled men having reference essentially to lesser skilled men, and was drafted with a view to facilitating the employment of ex-service men.

The minimum qualifications were set out under four heads :

<i>Previous Experience.</i>	Essential. Non Essential.
<i>Mental.</i>	Extra Good. Alert. Ordinary.
<i>Physical.</i>	Active. Strong Heavy. Full Height. Ordinary.
<i>Disabled.</i>	Sitting Job. Walking Job.

Attached to each request was a counterfoil which the applicant put forward by the Exchange had to present at the works. This was done to control the applications received as the official green cards of introduction issued by the Employment Exchanges were issued too indiscriminately and created ill feeling if a vain journey were made.

Selection of
Workers.

Under the arrangement set out, each applicant was assured of a proper interview, and unless the Employment Exchange judgment in selection was badly at fault, stood some chance of engagement.

The Exchange staff were induced to take much more trouble in sorting out applicants than was previously the case, and a high percentage of discharged service men were fitted to jobs that could not have been safely reserved for them, because the minimum qualifications might rule out a large number and yet be such as some discharged soldier could properly fill.

Associated with this programme was that of all ex-service men being examined by the works medical referee,—already mentioned on page 215.

The applicability of these schemes to other factories hinges on the calibre of staff at the local exchange and their willingness and ability to break away from the purely paper record and exercise their personal judgment. A compromise would be to issue two counterfoils to each order and allow the Exchange to submit two applicants at a time for each vacancy.

From the point of view of the community, the possibilities of the scheme are attractive in giving a chance to the less able bodied members, whether as a consequence of war or not, without detriment to production or to the employer. The analysis of the statistics of National Service published in February 1920 emphasised the terribly high proportion of men in industry who are physically below a reasonable standard of fitness. While it is good to have the best possible man for each job, there is something wasteful in placing the strong men on relatively light jobs and for the heavy jobs to be performed by those barely able to perform them. Leaving out any thought of the community's interest as a whole, the disabled soldier has a special claim to be considered and this scheme automatically lets him in wherever he can comply with the minimum qualifications laid down for each vacancy as it arises.

In considering the arrangements necessary for the engagement of workers, there is much to be said for the establishment of a special office to deal with applicants in the first instance, to take down particulars on an employment form, and arrange for interviews with foremen responsible for engagement. The same office would

Works
Enquiry
Office.

p. 76.
F 16. p. 249.
p. 340.

**Works
Enquiry
Office.**

have other duties of a routine character pertaining to insurance cards, transfers, promotions and discharges.

F 146. The arrangements for controlling labour engagements, transfers, discharges etc. are further discussed on page 336.
F 147.

It became common practice during the War to have such an office apart from the ordinary time office and usually the office was called the works employment bureau or labour office. This description implies power to engage which should hardly be exercised by a clerk. A better alternative title is that of *Works Enquiry Office*.

The direction of the works enquiry office could fittingly come under the labour co-ordination officer previously discussed on page 189, and in a small works the duties might be merged in the one individual.

In the matter of discharge, a suitable routine is indicated on F 20. the specimen discharge note.

It is desirable practice that each worker on leaving should receive F 148. a discharge paper certifying the length of service and capacity in which employed. This would be made out by the wages office.

**Apprentice-
ship.**

The question of training resolves itself into actual apprenticeship or its equivalent.

p. 24.
p. 77.
p. 190.
p. 204.
p. 269.
p. 337.

In the past, apprentices have not had sufficient attention paid to their training, but this virtual breach of faith is being remedied now. Most employers have realised their duties in this direction and, once realised, the response has been whole-hearted. The employers' faults have often been due more to want of thought than want of goodwill.

Amongst the latest schemes of apprentice training, deserving of special notice as being arranged on broad-minded, common-sense lines, is that put forward by the North East Coast Institution of Engineers and Shipbuilders and adopted by the group of employers concerned in May 1917.

The recommendations of the Institution were as follows :—

Education of Apprentices.¹

(THE NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS)

(1) That the North-East Coast Institution of Engineers and Shipbuilders be appointed by the Employers' Associations in connection with Engineering, Shipbuilding, and Ship-repairing on the North-East Coast, as their representatives, to act in a consultative capacity with the Local Education Authorities for the development of apprentice training in technical education.

¹ Extracts, by permission, from Report published May 1917 by the North-East Coast Institution of Engineers and Shipbuilders. Balbee Hall, Newcastle-on-Tyne.

(2) That prospective Engineering and Shipbuilding apprentices be drafted Apprentices- at 12 to 13 years of age to Junior Day Technical Schools for a three years' ship. course of general education, including, amongst other subjects, Mathematics, Mechanics, Machine Drawing, and Manual Training. Provision should be made also in these schools for the continuance of moral and intellectual training as well as physical exercises, organised games, and the encouragement of corporate life.

(3) That an Advisory Committee of representatives of the North-East Coast Institution and of employers and employees be associated with the management of these schools in a consultative capacity.

(4) That employers give preferential appointment to these youths on passing out of these schools, and that in future the selection of apprentices be a function of a member of the administrative staff of the works, acting in close consultation with the headmasters of the Junior Day Technical Schools.

That the periods of efflux of these boys be arranged to suit the requirements of the district.

(5) That a selection (a small percentage) be made from these boys of those showing exceptional ability, solidity of character, and general promise at the beginning of the apprenticeship, and that they spend half the week in the works and half in the Local Technical College, in which they would receive a special two years' course of technical education. From these youths, it is expected, would be drawn the future foremen and higher officers of the industries.

(6) That a second selection be made from these exceptional boys on the completion of the two years' course (see 5), and that these should pass direct to the University for the full engineering or Naval Architecture degree courses.

(7) That the Local Education Authorities or the State provide scholarships and maintenance grants, so that the poorest boy may have the full course from the elementary school to the completion of the University Course without financial anxiety.

(8) That the remainder of the boys (a large percentage), passing into the works as ordinary apprentices (not selected as in recommendation 5), should be liberated from the works for at least two half-days a week, and if possible three, for the purpose of attending part-time day continuation classes. That attendance at these classes be compulsory up to 18 years of age, and the time so spent be regarded as part of the apprenticeship, with no reduction in wages.

(9) That definite practical instruction be given to all apprentices by expert craftsmen in the shops throughout the whole of the apprenticeship.

(10) That suitable arrangements be made :

(a) For the transfer of apprentices from part-time to half-time, and *vice versa*, on due cause being shown.

(b) For the disciplinary forces of the employers to be available in the schools in the early stages of backsliding.

(c) For the forfeit of the facilities provided under the scheme in case of continued failure of the apprentice to appreciate the advantages.

(11) That in view of the near reform of our educational system, and the foreshadowing of compulsory part-time day continuation classes to 18 years of age, and in view also of the fact that Local Education Authorities are now considering their educational programme after the war, we recommend the Council, if this report be adopted, to press upon the Local Authorities the consideration of this scheme, with a view to its being put into operation at the earliest possible moment.

(12) That a deputation from the Institution interview the President of the Board of Education to urge the importance of a generous provision of Junior Day Technical Schools and of Day Apprentice Classes, accompanied by greater financial aid for their maintenance and by a revision of the regulations governing their management.

The Institution of Naval Architects has more recently still—February 1920—drafted recommendations, as given below, relative to apprenticeship which reflect the new spirit in Industry :

(1.) That it is desirable to have an indentured system of apprenticeship, where practicable, or at the least a definite understanding between all the parties concerned, involving direct obligations on both sides, viz. : on the part of the

Apprenticeship.

apprentice to learn his trade, in the broadest sense of the term, with diligence and application, and on the part of the employer to teach the apprentice his trade and assist him in every practical way to continue and improve his education during apprenticeship. It should be borne in mind that facilities must be given for apprentices to attend day classes during apprenticeship in accordance with the provisions of the new Education Acts.

(II.) That the selection of apprentices shall as far as practicable be made on the basis of results of their previous school education, so that the boys may be apportioned to their respective trades, having due regard to their physical and intellectual abilities. In this connection the assistance of local committees—as already exist in some localities—on which employers, employees, and education authorities are represented should be sought.

(III.) That apprentices should be under the specific care of a supervisor of apprentices, appointed by the employer to oversee the training and education of the apprentices. If necessary, this appointment might be made by groups of firms or employers. Practical instruction should be given to apprentices by selected employees, facilities being given to the apprentices to learn their respective trades, care being taken to avoid over-specialisation. Employers should take an active part in the direction of the apprentices' education outside working hours.

(IV.) That as the proportion of boys, other than apprentices—now mostly under sixteen—will, owing to the new Education Act, be greatly reduced in the future, and as these boys will be generally of a more advanced age and of a higher standard of education than hitherto, it is desirable to give them an opportunity of becoming apprentices or of taking some satisfactory and permanent place in the industry.

(V.) That facilities should be provided whereby any boy who desires to do so can change his trade, subject to his progress in school and works being satisfactory.

(VI.) That facilities and assistance should be given to the best qualified apprentices, judged by their school and works records, to take a recognised university course in naval architecture and engineering, the time so spent counting as part of their apprenticeship.

(VII.) That facilities should be given to boys who remain at school after the age of sixteen to enter the works as apprentices. These facilities should admit of their readily taking part in the scheme for following a university course as indicated in clause VI.

(VIII.) That wherever possible the development of the social or civic side should be encouraged by the formation of apprentices' clubs, as already established by some firms.

Another scheme put into successful practice some ten years ago in a southern works was subject to the following regulations, and it will be noted that a superintendent of apprentices and a mechanical instructor were appointed. The superintendent was a member of the technical management staff and a parallel to this arrangement is suggested in clause 4 of the North-East Coast Institution's recommendations, and definitely advocated in clause III. of the Institution of Naval Architects' recommendations.

Regulations for Trade Apprentices.

I. QUALIFICATIONS.

The age at the commencement of the trial period must not be less than 15 or more than 16½ years.

Applicants will be required to sit at an Entrance Exam. to be held at the beginning of March or September at the local Technical Institute, to test their general education. The subjects of examination will be English, Mathematics, Science and Drawing, to the extent covered by the preparatory course at that Institute.

Applicants must be of sound constitution and good bodily health and ~~Apprentices~~ strength, and after passing the entrance examination will be subjected to ship. medical examination by a Medical Officer instructed by the Company. p. 215.

2. TRIAL PERIOD.

Selected applicants will be employed on trial in the Works for 600 hours, commencing either at the beginning of April or October.

The regulations and scale of pay for Indentured Apprentices will apply during the trial period, but pay will be suspended if behaviour is not satisfactory.

3. INDENTURES.

After the trial period, if the applicant has been industrious, has kept good time and gives promise of being a good workman, the Company will execute with him, in conjunction with his parent or guardian, an Apprenticeship Indenture covering the time of service.

A premium of 5s. is payable to the Company, with 2s. 6d. stamp duty, on the execution of the apprenticeship deed.

The Company reserves the right to suspend or discharge any Apprentice for inefficiency, bad timekeeping or misconduct.

4. DURATION OF APPRENTICESHIP.

The full term of apprenticeship to the trade of Machine Shop Mechanic, Patternmaker, Carpenter, Plater, or Blacksmith is 12,650 working hours. With good timekeeping this term can be completed in rather less than five years. The full term for Tinsmith or Moulder apprenticeship is 7,600 hours, which with good timekeeping can be completed in rather less than three years.

The usual Works Holidays as stated in the Works Regulations have been allowed for in fixing the number of hours to be worked.

5. COURSE.

The courses laid down for the various trades are stated in a separate schedule, which gives the normal period for each stage.

By "normal period" is meant the time required by any intelligent, industrious trade apprentice to acquire the standard of proficiency necessary to promotion to the next stage of work.

Apprentices showing persistent diligence and merit in their practical work and their studies will have the opportunity of entering the Ratefixing, Drawing, or other Office Department for the last stage of their apprenticeship—subject, of course, to the number of vacancies at the time. This privilege will carry with it exemption from attendance before breakfast, without loss of pay, so that still further attention may be given to evening classes and studies.

Apprentices that do not qualify for the above privilege will do such work in the last stage of their course as may be merited by their previous progress.

6. INSTRUCTION.

The Mechanical Instructor, acting under the direction of the Superintendent of Apprentices, devotes his whole time to assisting the apprentices to become proficient in each stage of the various shop courses.

Instruction in Workshop Drawing will be given by the Company, as may be found necessary and convenient.

If attendance on Instruction Classes be required during working hours, as will usually be the case for instruction given by the Company, the time will be regarded as time worked and be paid for accordingly.

p. 77.

7. PAY.

The rates of pay, per hour worked, are also stated in the separate schedule, and it is to be understood that advances in pay will be contingent not merely on the proper number of hours being worked, but also on the requisite proficiency being attained in the stage of work in hand.

Overtime will be paid for in accordance with the Works Regulations. No apprentice under the age of 18 will be required to work overtime, and only under very special circumstances will overtime be worked by any apprentice.

8. CONDITIONS OF WORK.

Apprentices shall be subject to all Works Regulations, including the hours of work, in force in the Department where they may be employed, and they

Apprenticeship.

will work under the direction of the Foreman, who will report to the Superintendent of Apprentices as to their behaviour and progress.

9. ABSENCE.

Apprentices desiring leave of absence must apply to their foreman, who will refer to the Superintendent of Apprentices before granting same. Applications should be in the form of a letter from the parent or guardian.

Absence with leave and absence that is covered by a medical certificate, will count as time worked, up to a maximum of 106 hours in any one year, exclusive of Works Holidays. Absence for which no medical certificate is produced, must be explained by a letter from the parent or guardian; and, if satisfactorily explained, will be counted as absence with leave.

In cases of prolonged illness, the question of counting any further part of the absence as time worked will depend on the record of the apprentice as regards progress and behaviour.

In all cases of illness the Company reserve the right to have their Medical Officer certify the fitness of the apprentice before he resumes work.

Absence without leave will have to be made up at the rate of two days for each day's absence.

10. EVENING STUDY.

Stress is laid on the importance of each apprentice diligently pursuing an organised course of evening study, such as that laid down by the local Technical Institute. Variations from this course must be submitted to the Superintendent of Apprentices for approval.

Particulars of classes for which entry is intended to be made must be sent to the Superintendent of Apprentices during the last week in September.

11. ANNUAL WORKS EXAMINATION

An Annual Examination in theoretical subjects and drawing will be made on behalf of the Company and marks awarded. The scope of these examinations will follow the lines of the Engineering Courses arranged by the local Technical Institute. The date of examination will be about the end of May.

12. RECORDS AND REWARDS.

A permanent record will be kept of the timekeeping, proficiency, industry, etc., of each apprentice. These, and examination results will be appraised annually by a system of marks.

According to these marks, but subject to a fair proportion of marks being obtained under each heading, annual prizes of £2 and £1 will be awarded in September of each year to the first and second respectively in each group of apprentices. The grouping will be for the apprentices joining in April and October of each year to be considered together, with due allowance for the difference in time served at practical work.

The first five in each group will also be paid in full for all Works Holidays during the ensuing twelve months. Apprentices, winning this privilege, who complete their apprenticeship before having reaped the full advantage, will be paid the balance in a lump sum.

Apart from these special rewards, the records will be the basis of promotion during apprenticeship and of re-engagement by the Company on completion of apprenticeship.

13. CERTIFICATE OF PROFICIENCY.

Apprentices completing their term to the satisfaction of the Company will receive certificates setting forth the kind of work in which they have had experience and the proficiency attained. Particulars will be given of their record generally.

Apprentices leaving, with the consent of the Company, before the completion of their term may be given similar certificates.

14. CHANGE OF ADDRESS.

Each apprentice must inform the Superintendent of Apprentices of each change in his parent's or guardian's address and his own.

15. INTERVIEWS WITH PARENTS OR GUARDIANS.

The Company will be pleased for the Superintendent of Apprentices to interview the parents or guardians of apprentices if an appointment is made beforehand.

16. MODIFICATION OF APPRENTICESHIP REGULATIONS.

Apprentice-
ship.

These regulations may be modified from time to time by the Company, but no variation for individual cases can be considered except in the case of a nomination by one of the Company's Directors. Any such individual^p variation, when agreed upon, will be noted on the apprenticeship indenture.

17. EMPLOYMENT ON COMPLETION OF APPRENTICESHIP.

It must be clearly understood that employment by the Company automatically ceases on completion of apprenticeship, but re-engagement may be made immediately after, or at some later period, according to the Company's requirements.

The Company will be glad to be kept informed of the whereabouts of former apprentices, and will give preference to such when vacancies occur.

Questions of welfare in the strict sense of the word arise for the employer when juniors are employed, and this is one of those social aspects of employment to which reference is made in Section III J, page 269. Employers have a clear responsibility for safeguarding the physical, mental and moral development of boys and girls in their service.

During the war, there was such an accession of women to the ranks of industry that innumerable occupations were invaded, particularly engineering, where women had small place before. Women have been engaged in the metal trades of lock making and chain making, for instance, for many years, though the women so employed were poor and worked under very rough conditions; and, again, in cycle manufacture and other trades under more favourable conditions, so that there is nothing new in the employment of women in engineering. The betterment of shop conditions and the recognition of sex requirements were essential for the tremendous development of women labour during the war. In the absence of women overseers with technical training, the palliative was adopted of "welfare workers" under the *agis* largely of the Ministry of Munitions to make good the inevitable deficiencies of hastily organised man-management of women. On the other hand, in trades such as the textile trades where women have been employed in large numbers for so many years, the conditions of man-management of women have become so established that the question of "welfare" workers, in the Ministry of Munitions sense; has not arisen.

Women in
Industry.p. 190.
p. 193.

While the employment of women in industry as a whole has received a set back with the return of the ex-service men, it is inevitable they will resume an important place when industry has become adjusted to peace conditions. It is not unlikely that instead of women working with men, as occurred during the war, works will tend to employ exclusively either women or men according to the character of the trade. To what extent women will acquire technical training and demonstrate mechanical skill sufficient to supply from their own ranks the nucleus of skilled craftsmen

Women in Industry.

practically necessary in every factory remains to be seen. Again, the ability of women to manage can only come from opportunity, and despite opportunity not every man-manager even is above criticism. It would certainly seem that the best development of women labour in industry could be that they should work under women managers, who in turn would have such technical assistance as the particular business called for. This line of development has been tested and found to work admirably. With the advent of the Lady Manager for women in factories, the conditions of employment, of selection and training, become largely parallel with that of men, and the woman "welfare" worker would disappear in her present rôle as the protector of morals. However, by changing her viewpoint of supervision to that of a labour co-ordination officer, discussed in Section III A, page 189, the former welfare worker might become an integral link in the management on a thoroughly sound economic basis, instead of seeming to work in a purely benevolent capacity, which, to say the least, is likely to be misunderstood by the workers because a virtue seems to be made out of a plain duty, *e.g.* first aid, which is commonly claimed as an expression of "welfare" work.

The future of women in industry is important because of the numbers concerned, so that the questions discussed above become important also as bearing on the efficiency of women employed or to be employed. It may help towards keeping a proper sense of proportion in these matters to quote the following notes by a lady manager :—

Women must be viewed as women, not as workers pure and simple if the best and finest results are to be expected. By nature being the conservers of life, theirs is the passive rôle—hence the limitations inherent in the sex. Their fear of the untried and the unknown brings about a lack of initiative—this gives them great efficiency as crude labour without the necessary qualities to assume or undertake responsibilities. This point brings into strong relief the merit of their work done in the War—their adaptability and staying power being a matter of universal acknowledgment.

It must be borne in mind that their work is seldom their main interest, for in a woman's scale of values, the emotional life usually ranks first, other interests being secondary. In consequence, in dealing with women workers one deals with a fluid force; consciously or even sub-consciously the majority of them view it as a temporary occupation. This must be reckoned with as a handicap to their being a very powerful force in the labour world. They are extremely susceptible to personal leadership and respond to the personal appeal. To bring out their best and to help them to the highest level of work they need constant encouragement and appreciation.

Their principal faults are due to lack of education, both mental and moral, which lack tends to a want of vision. Given improved home surroundings and an environment in early life more conducive to the development of ideals, this want of vision should tend to disappear. (This equally applies to men as well as women.) Too great stress cannot be laid on the want of any vivifying element in the present scheme of education and in the lives of Labour in the mass. Without an assured living income, this vivifying force cannot grow. The higher side of any individual nature runs great risk of being starved for lack of nourishment. "For lack of vision the people perish."

III G

WORKS REGULATIONS

WORKS Rules or Regulations, as usually understood, seem to consist mainly of restrictions and penalties. Rules of this character are quite properly disapproved by many managers, if only that so much regulation of conduct is attempted that it is not possible to apply the rules literally. The maintenance of good conduct or reasonable discipline is a matter of supervision; and efficient supervision is not merely a question of rules: The broader aspects of shop supervision are discussed in Section II G under Foremanship, pp. 159 *et seq.*, while Section III H, p. 260, deals with General Discipline.

Purpose of
Works
Regulations.

As for fines, they constitute an undesirable instrument of discipline, causing resentment out of all proportion to the good done. They indicate an out-of-date arbitrariness rather than strength of management.

p. 108.

On the other hand, the management may wish to regulate for reasons of safety or health the worker's conduct in some particular, that would not be embraced by any ordinary code of ethics. A typical case is, perhaps, that of smoking in certain areas, and another is that of taking meals in the shops, when a mess-room or canteen is provided. It is necessary to publish notices, if any prohibition is to be effected without unfairness.

With a few exceptions of this sort, works regulations should not consist of prohibitions, but should be essentially a statement of the routine arrangements designed to establish smooth working and equitable treatment.

Works regulations, when properly drafted, should have the value of "working drawings" of the labour administration system generally and while giving the requisite detail necessary to uniform working will, at the same time, reflect the spirit in which the works are being governed.

It is reasonable that works regulations should be an approved subject for discussion with a works committee, so long as there is

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Regulations.**

no question that all regulations must hold good until they are officially amended. This consideration alone makes it highly desirable to reduce all regulations to writing and official publication. The expense of printing the works regulations should be faced as giving a definite return not merely in point of a better ordered administration but also as a contributory factor to the spirit of mutual confidence. The best medium will be a booklet, containing all the regulations, for issue to all foremen, chargehands, members of works committees and staff, with printed notices, covering the more salient points, exhibited throughout the works.

The management must be able to take their ground firmly that the works regulations are a necessity of orderly government in the works as laws are in the State. They must be further prepared to show that there is a good and sufficient reason for every ruling, or alternatively they will amend it when they are convinced equity demands it; and above all, there must be equal application of the regulations to all sections, to the skilled workers as to the unskilled workers. Personal discrimination, if exercised when not provided for in the official regulations, is fatal to mutual confidence, while on the other hand inconsistency in the exercise of that discrimination, when recognised as applicable to certain cases, will be equally damaging to a general belief in the good faith of the management.

It is in this connection that the labour co-ordination officer—referred to on page 189—may do such invaluable work by investigating the circumstances of these apparently special cases and providing for consistent treatment under the direction of the management.

p. 216.
p. 344.

Lost time provides the most fertile field for discrimination and, all too commonly, for favouritism, whether based on a sense of indispensability or not of the worker concerned. The arrangements indicated as to late comers being interviewed by the labour co-ordination officer, and absentees, on their return, by the works medical referee can be made to eliminate most successfully all unfairness or inequality of treatment and yet set up, without friction, a higher standard of discipline to the benefit of the worker, equally with the employer.

Local circumstances must determine many details of works routine but the time should be approaching for the principles of works regulations to become substantially uniform throughout industry. Whether that is too optimistic a view or not, it will help to focus attention on the main aspects to be considered by quoting representative regulations.

Before proceeding to these examples, which are taken from actual practice, with slight modifications to make them of wider application, it will be convenient to set out the range of regulations likely to be required in any works.

1. Terms of Engagement.
2. Admission to Works.
3. Hours of Work.
4. Overtime & Special Working.
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 - (a) Piecework System [or Premium System].
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16. General Restrictions.
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18. Works Co-ordination Committee.
19. Auxiliary Committees.
20. Apprentices.

1.—TERMS OF ENGAGEMENT.

Every employee is engaged on the basis of a fixed hourly rate, and paid only in respect to time actually worked. **Terms of Engagement.**
p. 237.

One hour's notice¹ only is legally due on either side to terminate the engagement except in the case of dismissal for misconduct, when no notice whatever will be necessary.

Employees desiring to leave of their own accord should notify the Works Enquiry Office as well as their Foreman.

It is a condition of all engagements that the applicant shall observe and be bound by the published Works Regulations. Failure to properly comply with these regulations will terminate the engagement, and no notice or pay in lieu will be due. F 16.

Workers may be suspended at the discretion of the Management as a warning for the first offence against any Works Regulation instead of dismissal.

Variation in the regulations will be duly announced before coming into operation.

Each employee is responsible for making himself or herself immediately conversant with the regulations as posted in the appointed places in the works and should refer to the full set of regulations at the Works Enquiry Office. p. 239.

All workers must comply with the rules laid down from time to time as to the booking of time on various jobs done and the checking of the work.

All regulations apply equally to men and women workers unless otherwise indicated.

Extra pay is not made up at other than the regular times and workers leaving at intermediate times will have whatever extra pay is due forwarded by post in due course, if they leave their address at the Works Enquiry Office.

Workers are requested to keep the Works Enquiry Office advised of any change of address, during their service with the Firm.

¹ Under the Munitions of War Act, one week's notice was necessary.

2.—ADMISSION TO WORKS.

Admission to Works. Works Admission Cards are issued to all workers for identification purposes and must always be carried.

It is a condition of employment that Works Admission Cards shall be shown on demand to any responsible Works Official, at any time and must always be produced when drawing pay.

A deposit of one shilling, in respect to each such card and special case for same, is withheld from wages, and refunded on return of card and case.

3.—HOURS OF WORK.

(Dependent on local conditions and trade union agreements.)

Hours of Work.
p. 209.
p. 219.

4.—OVERTIME AND SPECIAL WORKING.

Overtime.
p. 203.
p. 209.
p. 343.

(a) *Overtime*

Overtime allowances will only be paid after a full ordinary day has been worked (see Regulation No. 3).

Time and ——— Rate will be paid for the first two hours overtime and Time and ——— Rate afterwards.

Overtime on Saturday afternoons for shop cleaning purposes must terminate at — p.m.

Workmen will not be expected to work more than — hours overtime in any four consecutive weeks, except in the following cases :—

I.—Repairs or Replace Work of any kind.

II.—Making up time lost through breakdown of plant.

F 23 No overtime will be paid for until an Overtime Authorisation has been received at the Time Office signed by the Foreman and approved by the Works Manager. Payment will be made to the nearest five minutes worked.

Workers who are required to work Week-end Shifts, that is, either Saturday Night Shift or Sunday Day Shift, will be instructed by their Foreman, who will arrange for a covering Overtime Authority, without which the Time Office cannot allow Time Cards to be stamped.

(b) *Payment for Meal Times.*

In certain very exceptional cases, workers are paid through meal times owing to their remaining continuously on duty, and special passes are granted accordingly to allow them to have their meals in the shops. In such cases those working on one shift must remain on duty until relieved by the next shift, unless sanction to the contrary is first obtained from the Foreman.

All meal time working has to be authorised on each occasion before payment will be made. The authorisation may be done weekly for regular cases, if any.

p. 210.

(c) *Night Shift.*

Night Shift hours are arranged as follows : — p.m. to — a.m.

Men taking over machines worked by juniors during day may have to start at — p.m.

Meal Hours, — to — p.m. and — to — a.m.

Payment will be made at Time and ——— Rate for all hours worked.

The change from Day Shift to Night Shift and *vice versa*, will usually take effect fortnightly on Mondays, but should a workman be called upon to change on any other day, working continuously, the Rate of ——— will be paid after the full shift's hours have been worked.

Week-ends.

Time and ——— will be paid on Saturdays from — p.m. to midnight. All Sunday work will be paid as double time. Time and ——— will be paid from Sunday midnight to — a.m. Monday.

(d) *Working on Public Holidays.*

Double Time Rate will be paid for working on Good Friday and Christmas Day.

Time and — Rate will be paid for working during the usual works hours on the following days : p. 210.

Easter Monday.	Whit Monday.
August Bank Holiday.	Boxing Day.

Time and — Rate will be paid when — hours have been worked.

5.—ENTERING OR LEAVING THE WORKS.

All persons employed shall enter or leave the Works by the authorised gates. Entering or Leaving.
F 22.

All workers are required to stamp their Time Card at the proper Time Recorder on the following occasions :—

" TIME IN," at the commencement of each day or night, and on resuming work after each meal (except at early breakfast on night shift).

" TIME OUT," when stopping work for the day or night.

When stamping, each worker must take the Time Card bearing his number from the first rack and, after stamping the card, place it in the second rack under the correct number. It is each worker's own responsibility to see that the correct time is recorded on his Time Card before placing same back in its proper place in the rack.

Any worker taking away his Time Card will be deemed to be absent, and pay will be stopped accordingly.

Any worker wilfully recording anyone's time but his own will be liable to instant dismissal. Accidental error must be reported at once at the Time Office.

Only Time Recorder Stampings will be recognised, and payment will not be made for time unrecorded ; omission to clock Time Card both " IN " and " OUT " will be held to be a breach of works regulations and involve action by the Management accordingly.

Workers leaving work, or arriving at other than the usual hours, must obtain a Gate Pass from their foreman, and this must be shown and after-wards given up at the Time Office. Payment will be made to the nearest quarter hour worked or if train service inconvenient, to the nearest five minutes. F 24.

Application for Gate Passes will not be considered at the Works Casualty Station other than for accidents, and the Works Medical Referee can only be consulted for illness at the request of the Management

A special gate is opened at — a.m. and — p.m. for early comers to get access to the Canteen, and remains open until the Main Gates and Time Recorder Stations are opened viz. 15 minutes before each starting time, both at beginning of shift and after meals, and " IN " stampings before this time cannot be recognised.

The Works Gates are closed punctually at the proper starting time. Three minutes' grace is allowed at the Time Recorders, and later stampings will be penalised by deduction of time with a minimum of one-quarter hour.

Workers not in at the proper starting time of each shift will not be admitted until the next break, unless, after interview with the Labour Co-ordination Officer, exception is made owing to good timekeeping record or very exceptional circumstances such as train delays or weather difficulties. Workers allowed in late on this account will be paid to the nearest five minutes.

Any worker leaving off or making preparations for leaving off work before the proper time, that is before the shop bells ring, is liable to dismissal without notice or payment in lieu of notice.

6.—PAYMENT BY RESULTS.

Two systems of extra pay are in operation, (1) a piecework system and (2) a bonus system for time workers. Under both systems time wages at the fixed time rate for each worker are guaranteed for each hour worked as a so are overtime allowances. Payment by Results.
p. 128. p. 210.
p. 203. p. 234.
p. 206. p. 364
p. 207.

The extra pay due under either system is the amount earned over and above the guaranteed or bare time wages exclusive of overtime allowances.

Payment by Results.*(a) Piecework System [or Premium System].*

The Piecework System applies to work that can be dealt with as separate jobs for which a Job Rate (or Piece Rate) can be fixed with accuracy.

p. 119.

The Job Rate is made up of a Preparation or Starting Allowance for each original start on a given operation and for each re-start after an authorised interruption together with an Operating Allowance for each piece done. Extra Allowances are made, when considered necessary, in respect to special difficulties outside the control of the pieceworker.

Job Rates, after they have been established, will not be altered, unless the means or method of manufacture are changed. No limit is placed upon the amount of Extra Pay that may be earned by any pieceworker.

If defects in material or faults in previous operations become apparent, they must be at once reported, and the time spent on the defective piece will be the subject of consideration and special allowance made. If, however, the defect is not pointed out as soon as it could have been seen, then no allowance will be made in respect of any of the time. Work not passed as correct will be dealt with on its merits, and if correction is possible, the wages cost of the correction will be deducted from the Extra Pay otherwise due. The Management reserve the right to stop all Extra Pay on careless workmanship, whether the work can be utilised or not.

p. 124.

Pieceworkers on operations with which they are unfamiliar are eligible during the production of the first few pieces to be considered as time workers if their piecework extra pay is less than the Bonus for Time workers. This concession is normally limited to either the first 100 pieces or one week's work if less than 100 pieces are done in that week.

In the case of employees working in fellowship, the Extra Pay is shared out according to the time wages of each member of the group for the time worked, exclusive of overtime allowances. If the name of anyone concerned is omitted from the group piecework card, then his share of Extra Pay is divided among the rest of the group. Each member of a piecework group is responsible for writing his name on the Group Work Card provided.

F 250

Apprentices on journeymen's work will have a proportion, only, of their time counted against the job rate as follows: 1st year, 25%; 2nd year, 33½%; 3rd year, 50%; 4th year, 66½%; 5th year, 75%. [This ruling may vary according to trade.]

p. 463.

F 29.

Pieceworkers Extra Pay becomes due and is paid the week following after it has been earned. This is done to allow viewing to be completed and to facilitate the work of the Wages Office. Particulars of piecework earnings are placed in the Pay Envelopes.

p. 135.

p. 234.

(b) Bonus System for Time Workers.

All workers for whom it is not practicable to arrange for direct payment by results under the piecework system will, as time workers, be eligible for extra pay under a collective bonus system calculated on the output efficiency of the department, as a whole, in which the respective time workers are employed. The more the pieceworkers earn the better will be the output and unless the proportion of time workers required in connection with that output unduly increases, the time workers will get a bigger bonus as the output rises so that there is a common interest between pieceworkers and time-workers in obtaining efficiency.

Departmental output efficiency is measured by the comparison of cost with saleable output and in making the calculations as to departmental cost, only those items are considered which are at all controllable by the department concerned. The outstanding items are the "Wages" paid, and the cost of spoiled work, which means, broadly, that the greater the output and the less the rejections for a given number of workers, the higher the bonus.

For auxiliary departments without a direct output of saleable product the output basis adopted is that of the whole works.

p. 164.

In the case of charge or section hands, the relative efficiency of the group of workers in their charge will be the basis of their bonus.

F 25.

F 27.

Bonus will only be paid when properly filled-in Job Advice Slips or Daily Time Slips, quoting the correct Job Nos. for the work done, are furnished promptly for the whole of each period on timework.

The slips are obtainable from the Foreman or Charge Hands only.

The bonus is paid fortnightly, and is computed as a bonus rate per full shift, lost time being deducted *pro rata* to the nearest tenth.

7.—AWAY ALLOWANCES.

When men are employed away from the works reasonable time, or money, **away Allowances.** payment, will be allowed for journeying to and from their work.

If employed more than one mile away from the Works the following allowance will be made to those in receipt of hourly wages :—

For periods of less than 24 hours (if not returned to the Works within one hour of Works meal times),

Breakfast, —. Dinner, —. Tea, —.

For periods of less than 7 days, — per 24 hours.

For periods exceeding 7 days, — per week.

Meals on train When train journey exceeds 6 hours a meal allowance of — will be paid, and after that period the allowances as above will apply.

Fares, Third Class Travelling Time. Travelling time will be paid as bare time and will only be allowed at the beginning and end of job unless ordered home previously.

Accommodation provided by the Company When meals or lodgings are provided by the Company, the respective allowances will not be paid.

Exceptional Expenses Variations from the above allowances will be duly considered by the Works Manager on production of vouchers. Cab fares can only be allowed under special circumstances

Payment in advance When an employee is sent away he will receive his F 35. return fare and allowances according to above scale up to and including the following Wednesday night This money is to be accounted for on the Away Expenses Sheet that has to be rendered each Wednesday night accompanied by an Away Time Sheet, and the next week's allowance will be sent F 36. with his wages Exceptional expenses must be reported with ordinary F 37. expenses but no details are required of the expenditure of allowances due according to these rules.

8.—INSURANCE CARDS.

Insurance Cards will be held in the Wages Office and duly stamped each **Insurance Cards.** week

At the end of each insurance period, or on leaving, the cards will be returned to the respective employees. New period cards must be handed in as quickly as possible p 367.

Workers failing to hand in their new period cards, either health or unemployment, within the proper period, will (after warning) be liable to have their pay held up until this has been done.

Enquiries as to Insurance Cards must be made at the Works Enquiry Office.

9.—PAYMENT OF WAGES.

Wages are made up to Wednesday evening, and paid on Friday at — p.m. **Payment of Wages.**

The works bell will ring five minutes beforehand, and again at the time above stated. p. 76.

Employees must clock "OUT" before drawing their pay. Disregard of this instruction has been responsible for frequent omissions to clock the card at all, with consequent loss of pay p 360

The completed Time Card is re-issued as a Pay Card on Fridays to workers F 22. on duty that day.

The Pay Card has to be given up in exchange for the Pay Envelope, and F 33. each worker at the same time has to show his Works Admission Card.

The amount of cash in each Pay Envelope is marked outside and any difference in the cash actually received must be reported at the time to the Pay Clerk in attendance at each Pay Station. No complaints can be entertained afterwards.

The Pay Stations are open for 25 minutes.

Monies not claimed at the regular time will be paid out at the Pay Stations from — p.m. Saturdays, or from — p.m. Mondays, and not at other times.

Payment of Wages.

Pay queries must be lodged at the Time Office between — p.m. Fridays and — p.m. Mondays, not later, and written replies will be found in the Time Cards Rack. Applications for back pay must also be made at these times. Pay adjustments, when found necessary, are made on Mondays.

F 157.

Workers unable to claim their pay in person may send a letter accompanied by their Works Admission Card authorising some other person to draw the money. No money will be paid over to anyone else, whether a relative or not, without written authority to do so.

Money will be sent by post, when requested. If request is made by personal call at the Works Enquiry Office, particulars will be taken down and applicant asked to produce Works Admission Card and, if pay cannot be made at the time, to give a confirming signature as to address.

p 361

When any worker's money has been lying unclaimed for a fortnight his name and check number will be posted at the Main Notice Board for seven days and at the same time communication accordingly sent by post to the last known address of the worker in question. Monies not claimed within three months will be handed over to the Works Aid Committee for donation to approved causes.

Employees are strictly forbidden to enter into any private arrangement with their foremen or charge hands regarding pay.

10 — LOST TIME.

Lost Time.

p. 217.

p. 260.

p. 341.

Absence without leave and repeated lateness, if not satisfactorily explained, constitutes misconduct, justifying dismissal without notice

Latecomers may be admitted on reference to the Labour Co-ordination Officer under certain circumstances (see Regulation No. 5).

Where absence for more than two days is caused by sickness, a medical certificate must be furnished on each occasion or it will be considered as absence without leave. If the absence continues, a further certificate must be furnished weekly.

Workers returning after absence from any cause whatever may be required to attend before the Works Medical Referee when sent for, and are expected to answer his enquiries. Refusal to do so will mean that the absence will be assumed to be absence without leave and will be dealt with accordingly.

In the absence of the Works Medical Referee or for other special reasons, the Labour Co-ordination Officer may interview returning absentees. Ordinarily he will be present at interviews with the W.M.R. except where special privacy is desired.

The Works Medical Referee, when in his opinion necessary, will require medical certificates on a special form in respect to which the Firm will contribute part of the cost.

Medical certificates should have the Check No. written on boldly, and should in all cases be addressed to the Time Office.

Leave of absence is authorised when the proper printed ticket, signed by the Foreman concerned, is handed in at the Time Office. This ruling does not apply for absence of more than one shift or immediately following a holiday when the Management must first approve the Foreman's application.

F 146.

Workers absent at the proper starting time are liable to have their work put into other hands and their duties changed.

Certification of illness will not necessarily keep an absent worker's post open, though every consideration will be shown if re-employment is desired on recovery.

In cases of notifiable diseases occurring at a worker's place of residence, scrupulous regard must be paid to the interests of public health by the worker remaining in quarantine as long as necessary. Medical certificates as to freedom to return to work will have to be furnished.

Any worker coming to work in contravention of the Medical Officer of Health's ruling will be dismissed without notice or pay in lieu of notice. The principal diseases in question are Diphtheria, Measles, Scarlet Fever, Smallpox, Typhoid and Cerebro Spinal or Spotted Fever.

11.—TRANSFERS.

All transfers must be individually authorised by the Works Manager. **Transfers.**
Any attempt to obtain transfers by offering reward of any kind will be severely dealt with. F 146.

Workers working in other departments, or in other capacities than their check nos. indicate, must refer to the Works Enquiry Office, with a view to their transfer being put forward for authorisation. p. 338.

Failure to do this may mean extra pay for such employees being held up until the records have been amended.

Temporary transfers from one department to another (if for not more than two days) will not involve change of check number, but in these cases the work card or job ticket must be certified each day by both Foremen concerned.

12.—TOOLS AND DRAWINGS.

Any workman failing to comply with any Rules made regarding the return of Tools and Drawings to the proper Stores will be liable to suspension until satisfactory explanation has been given. **Tools and Drawings.**

The loss of tools or breakage of same without good cause, will be held to be a breach of works regulations and involve action by the Management accordingly. p. 103.

When leaving the firm's employ or drawing all lying or back time, a Tool Clearance Receipt must be obtained from the Department Tool Stores, and handed in at the Wages Office before pay will be made. Tool Checks that cannot be accounted for will be charged at one penny each, and missing tools at cost price or less, and the amount deducted from the wages due. Any such deductions will be duly refunded on the return of the missing items. F 21.

The Company will afford facilities to men desirous of providing themselves with private tools at trade prices, and by instalments. Particulars may be obtained at the Works Enquiry Office. p. 144.

13.—ACCIDENTS

Anyone meeting with an accident in the Works will be given First Aid Treatment at the Works Casualty Station. **Accidents.**

The Casualty Nurses' instructions are to give first-aid treatment at the time of the injury only, and to refer the injured person to a Hospital or Panel Doctor for further treatment. Such requests should be strictly followed. p. 5.

It must be clearly understood that the injured person is responsible for obtaining the necessary after-treatment. p. 76.

Workers failing to follow the Casualty Nurses' instructions as to referring to their Panel Doctor, or visiting a Hospital, should understand that they are acting against their own interests, and may involve themselves in difficulty regarding their claim to compensation. p. 214.

Anyone requiring treatment, unless too seriously hurt, should first inform Foreman concerned; in serious cases, the injured person's chargehand or nearest shopmate is expected to give this information, and otherwise assist. p. 229.

The Casualty Nurse on duty will be responsible as to when the Motor Ambulance is to be used and will notify the Time Office as early as possible. p. 262.

The Nurse is also authorised to issue Gate Passes when necessary for "walking" cases, and these must bear the Casualty No. as recorded in the Casualty Log Book. These passes require to be first taken to the Time Office concerned, so that time cards may be stamped. The passes must be given up at the Gates. F 24.

The Time Office is responsible for immediately advising the Shop Foreman concerned of any pass issued.

All injuries, whether severe or slight, sustained in the Works, must be reported by the injured person or someone on his behalf at the Works Casualty Station immediately they occur. It is not sufficient merely to mention the occurrence to the Charge Hand or Foreman.

Failure to report an accident immediately may cause difficulty in establishing a claim to Compensation.

Accidents.

The Casualty Nurse is responsible for notifying the Management of all accidents brought to her knowledge.

Injured persons will be called upon to attend before the Works Medical Referee weekly, or submit a medical certificate if unfit to come.

Injured persons, who have not been required to see the Works Medical Referee, on returning to work must report at the Casualty Station on arrival. F 154. Re-dressings, after the first re-dressing, have to be sanctioned by the Works Medical Referee.

F 38. Claims for compensation must be lodged at the Time Office, or sent by post to the Firm, the Check No. being always given.

The Works Casualty Station is closed during the regular meal times, except for emergency cases.

First Aid boxes are provided in the Works but injured persons are strongly urged to go to the Works Casualty Station for even seemingly minor injuries.

14.—PREVENTION OF ACCIDENTS.

Prevention of Accidents.
p. 226.

Operators are strictly forbidden to stand at any machine but their own.

Operators are warned against the grave risks of using gauges on work while in motion.

All employees are strictly forbidden to touch or handle electric wires, motors, or other electric apparatus or appliances, or in any way alter or damage the same. Those employees authorised to control this apparatus are, of course, excepted, but must carefully follow the several Rules provided for the purpose.

No moving part of any machinery is, on any account, to be cleaned or wiped down while in motion.

Machines must at all times be kept cleaned and oiled.

Employees are strictly prohibited from putting on main belts or driving belts between main shaft and counter shaft, or doing work on main shafting unless the engine or motor is stopped or slowed down. The repair and putting on of main belts is to be done only by the Beltman.

Employees, when wearing any loose jacket or sleeves or any loose garment of any kind, are specially cautioned against the danger of working at or in close proximity to any machinery in motion, or which is liable to be put in motion.

Employees having occasion to remove any guard or fence from any machine or belt must do so when the machinery is at rest; and must replace the guard or fence before re-starting the machine or belt.

Employees using any machinery, machine tool, or appliance of any description, must report to the Foreman-in-charge, without delay, any apparent or suspected defect or danger.

Employees are prohibited from standing or passing unnecessarily underneath suspended loads or walking under travelling loads. Those engaged in the lifting or moving of loads by cranes or otherwise are, in all cases, to give distinct warning to others who may be too near to keep clear.

Special care is to be taken in the selection and fitting of slings, chains, ropes, and any tackle for lifting loads, and only such are to be used as are of ample strength for the purpose.

Anyone who, through negligence or carelessness, subjects himself or herself or any other person to the liability of accident is to be at once reported to the Works Manager.

Notice to Women Employees.

Caps are provided essentially for the safety of the workers, apart from considerations of cleanliness, and must cover the whole of the hair.

Overalls and caps are provided on loan, and must be worn during all working hours. Every care must be taken to avoid damage or loss. They must be deposited in the proper Overalls' Depot at the end of each Shift.

No jewellery, such as necklaces, chains, bracelets, rings (other than wedding rings), may be worn.

15.—FIRE PRECAUTIONS.

No employee shall leave lights burning when work has ceased, or use naked lights in prohibited or dangerous places.

If fire is detected by any employee he should, with all haste, either inform a Patrol or press the alarm button at the hydrant nearest to the fire. By this signal the Works Telephone Exchange Operator is advised and acts accordingly.

All the Fire Signal Lights are switched on as a notice of fire.

A Fire Brigade is appointed for each Shift, and in case of fire the Brigade has charge of operations to put out the fire. The rest of the employees must carefully follow the instructions of the Works Patrols, so as to facilitate the work of the Brigadé, and safeguard life and property.

Fire
Precautions.

p. 264.

16.—GENERAL RESTRICTIONS.

(a) Access to the Canteen during unauthorised hours is prohibited. Employees having meals out of regular hours must show a meal pass, signed by their Foreman, before they can be admitted or served at the canteen. A counterfoil is supplied with each meal pass to serve as a gate pass, if required.

(b) No meals, either day or night, are to be eaten in the shops, nor may any one remain in the shops during meal hours or enter more than ten minutes before the next starting time. The making of tea and feeding during working hours is not allowed. The arrangements for employees whose work necessitates their having their meals in the shops are set out in Regulation No. 4.

(c) No baskets, bags, parcels, or bundles may be taken into the shops, but the same must be left at the Canteen Annex, where meals will be heated free of charge. Relatives or messengers bringing meals are not allowed inside the Works Gates.

(d) Smoking during regulation working hours is prohibited, and in certain areas at all times.

(e) Gambling in every form is prohibited in every part of the works area, including the Canteen.

(f) Money lending transactions as between employees are prohibited, and any employee borrowing money or accepting any gift in kind or money from a subordinate is liable to dismissal, except, of course, in the case of an approved shop collection.

(g) Every employee is forbidden to make or repair in the Works any article, however trifling, for the private use of himself or herself, or any other person.

(h) No notices, other than Works Club Notices, may be exhibited in or about the Works unless approved by the Management, and will then be posted by the Inspector of Patrols.

General
Restrictions.
p. 194.
p. 262.

p. 73.

17.—GENERAL FACILITIES.

(a) Fully equipped Canteens are provided for the supply of cooked meals and refreshments to every employee desirous of same, but no canteen property whatever may be removed or borrowed from the Canteen without the express consent of the Canteen Superintendent.

(b) Cycles must be left at the cycle shed, where they will be stored free of charge, subject to compliance with a set of Rules that may be made for the proper control of the cycle sheds. The Firm, however, decline to undertake any responsibility against theft, but have arranged a scheme with an Insurance Company by which any employee may insure in this respect for one shilling per quarter on application at the Works Record Office.

(c) Special wash places are provided for men employed on hot work and access before finishing time is dependent on the privilege being properly used.

(d) Shop collections may only be made, if approved by the Management, but the Management will not approve without the recommendation of the Works Aid Committee. Approved collections will usually be by sale of numbered tickets.

(e) Lost and Found Property should be reported to the Inspector of Patrols.

General
Facilities.
p. 263.

p. 262,

p. 263.

18.—WORKS CO-ORDINATION COMMITTEE.

Works
Committees.
p. 77.
p. 187.

The functions of the Committee, as its name indicates, are essentially directed to the investigation and adjustment of difficulties and differences arising out of our work and by interchange of views to consolidate the cordial relationship between all of us.

The Committee for the workers consists of representatives elected by secret ballot from each distinct Group of workers, on the basis of one representative for each Group when not less than twenty in number, and extra representatives in respect to each hundred members after the first hundred. The scheme of grouping, broadly, is to treat as separate Groups the skilled workers, the semi-skilled workers, and the labourers in each department, and, where the numbers justify it, separate representatives for each Shift in each Group. Where necessary, two or more Groups may be associated for the purpose of electing a representative.

Nominations should be handed in at the Works Enquiry Office seven days before the election.

Election is for six months, and takes place at the beginning of January and July.

From the Group representatives an Emergency Committee is elected, consisting of 3 skilled and 3 lesser skilled members.

The standing arrangement is that the committee shall meet by themselves each fortnight, and that the points raised shall be submitted at once to the Management for decision and reply. The Management will meet the Committee monthly.

Matters falling within the scope of the functions of the Committee should be reported by the worker interested to his Group Representative. Or, alternatively, direct to the Secretary of the Committee, the Labour Co-ordination Officer who is in attendance at his office at the works meal times.

Queries and suggestions may be verbal or in writing

The powers of the Co-ordination Committee lie wholly in having the opportunity of placing before the Management the full facts of any question for the exercise of a fair judgment by the Management.

Mass or Sectional Meetings in or about the Works will not be allowed, unless expressly sanctioned by the Management on the application of the Committee.

19.—WORKS AUXILIARY COMMITTEES

p. 220.

Technical Suggestions Committee.

This committee acts as a safety committee for the prevention of accidents and improvement of working conditions. It also considers technical suggestions for improving production. Approved suggestions are put forward to the Management, who make suitable awards for suggestions that can be put into practice.

The committee consists of four skilled workers nominated by the Works Co-ordination Committee, two foremen and two technical members of the staff, selected by the Works Manager.

The Works Medical Referee is *ex officio* a member of this committee.

Works Aid Committee.

p. 257.
p. 268.
p. 360.

This committee administers the monies subscribed weekly by employees. These contributions are collected through the wages of each worker who shall have indicated willingness to subscribe. The usual subscription is 6d. per week.

The firm adds 10 per cent. to these collections.

One-third of the funds is applied to benevolent purposes in respect to present or former workers who are in need, provided they were subscribers to the Fund, and the remaining two-thirds applied to Hospital and similar purposes.

Unclaimed wages are, after three months standing, transferred to the Works Aid Fund for distribution to approved causes, or applied to the support of special Works funds.

The committee consists of six workers nominated by the Works Co-ordination Committee, and four foremen-nominated by the Works Manager.

Works Canteen Committee.

This committee confers with the Canteen Management to assist in the successful working of the Canteen in the general interests.

**Works
Committees.**
p. 268.

The committee consists of four workers nominated by the Works Co-ordination Committee, two foremen and two members of the staff nominated by the Works Manager.

The above committees are elected every six months immediately following the election of the Works Co-ordination Committee.

The workers are invited to form Committees for Sports and Entertainments, for which reasonable facilities will be provided.

p. 190.
p. 269.

20.—APPRENTICES.

(A specimen set of regulations is given on p. 242.)

III H

GENERAL DISCIPLINE

**Meaning of
Discipline.**

THE normal conception of discipline is that exercised by a foreman in his shop relative to production and on that account of the workers' duties and efforts. This aspect of discipline is better described as supervision, and is discussed in Section II G—Foremanship and Inspection, page 159. The point may be added that unity of interest or co-ordination between the workers and the management is vastly more effective in the direction of discipline than mere exercise of authority, so that the character of foremanship as well as its efficiency is a reflex of the whole spirit of administration. The works regulations serve to establish the standard of discipline in certain directions.

There are questions of discipline which are outside the scope of shop supervision and not entirely definable by the works regulations. These are therefore apt to be dealt with in a rather disconnected way.

The principal matters falling within this category are as follows :—

Lost Time.

Shop Clocks and Bells.

Gate Control.

The protection of works property from theft, damage and fire, is rather outside even the broadest conception of discipline, but it is convenient to make further reference in this section to these matters because of their connection with gate control.

Lost Time.
p. 254.
p. 343.

Taking the case of lost time, that is lateness and absence, this is not infrequently held to be within the scope of shop supervision although the work of timekeeping is necessarily looked after by an office department—the time office—which by the nature of its work is not likely to be under any shop foreman, except in the extreme case of a construction contract away from the works and even then the principle could hardly be argued as sound,

p. 162.

There are likely to be at least several foremen in any works and **Lost Time.** it is quite easy for the question of lost time to be dealt with on different lines in each shop if each foreman is the referee for his own men.

The more a foreman's hands are freed for the legitimate duties of shop supervision, the more efficient production is likely to be. To relieve the foreman of the supervision of lost time is a distinct gain to him, and by enabling the matter to be centrally dealt with, a consistency of treatment can be assured that, incidentally, will add to the prestige of the management throughout the works.

On these grounds, lost time supervision can be delegated to the labour co-ordination officer (refer p. 344) working in conjunction with the works medical referee (refer p. 216). The advantages to be derived from this procedure will be appreciated by reference to the pages given above and to the specimen works regulations on the subject on page 254.. The general aspect of time keeping is discussed on page 340.

It is wise to have large size dial clocks in every shop in conspicuous positions, if only to make accuracy in time-booking possible, while in any case, if clocks are not provided on a generous scale there will be a distinct loss of work by furtive journeys of the less efficient workers to see the nearest clock. The provision of clocks so that every worker can see one with little or no effort engenders confidence and continuous working to the proper time ; it does not of itself induce slackness. The worker who is of the kind to " watch the clock " will, in the absence of a shop clock, either make frequent journeys to the nearest one or consult his own watch every few minutes. There is further point in the help a shop clock gives to foremen and management.

**Shop Clocks
and Bells.**
p. 341

Beyond an adequate system of shop clocks there should be a system of shop bells for sounding the starting time and the " knocking off " time. Such a system must be controlled from one centre such as the time office, and can be controlled by hand. It is, however, altogether better to arrange for automatic control by electric impulses from a regulator or master pendulum clock.

Synchronising, as this is termed, should be extended to the outside clock, if any, which would be the public clock specified by the Factory Act and to all the shop and office clocks and time recorders. The initial cost is by no means prohibitive and efficient maintenance is a simple matter if done to a carefully drawn up plan, strictly adhered to.

Shop Clocks and Bells.

The tangible advantage all round to be obtained by synchronising is appreciable and there is engendered an atmosphere of precision that is itself worth something towards stimulating voluntary attention to duty, which is a higher ideal than mere discipline.

Gate Control. Gate control is a convenient term for designating not only the duties attaching to controlling the traffic through the works gates but also of the duties that are conveniently associated with that aspect of discipline. The following list is fairly representative :—

p. 26. Gate Control—as to workers, goods and callers (works and offices) ; noting of times of arrival and departure of senior members of the staff, who do not otherwise record their time.

Care of shop door keys.

p. 257. Yard Control—duty as necessary, at time recorder and pay stations.

Cycle Shelters.

Cloak rooms.

Latrines, and wash places. } Control and cleanliness.

Attendance on injured persons to home or hospital.

Regulation of mass meetings in the works.

Posting of works notices.

Adherence to general restrictions laid down by works regulations.

Lost property and general enquiries from workers

p. 255. Safeguarding of works during nights, week-ends and holidays

First aid service, when works casualty station is closed

Relief telephone service, out of office hours.

Night duties as to watching boilers, turning off light, gas, etc.

Disinfecting all confined spaces.

Works fire brigade duty and fire drill of workers.

Works Patrols.

It will be obvious that in the larger works the above named duties require a number of persons and owing to the miscellaneous nature of the duties, the different persons too commonly work individually without co-ordination or common oversight. It will be found of definite advantage to appoint a foreman of unquestionable integrity and both tactful and a good disciplinarian.

The men under him, other than cleaners, are best called works patrols, and the foreman called the inspector of patrols. Uniform will be found to help the patrols tremendously in their duty and add to the dignity of the works. Although during the war the special constable uniform was not inappropriate, in the ordinary way such a uniform is undesirable, as suggestive of crime prevention and detection. The ordinary policeman has wider duties than this but the workers are inclined to take the view that works police are there because they, the workers, are not to be trusted.

Uniform on the lines of the commissionaire corps—black with red facings—does not suggest either police or military.

In some government works, the patrols are called warders but this savours of the prison, though where explosion risks obtain with the consequent right of search conferred on the warders, there can hardly be objection to emphasising their legal powers, even to calling them plainly works police.

Works
Patrols.
p. 264.

A suitable place for the headquarters of the works patrols is the gate house, if made large enough, and subject to the same condition, the gate house is usually a conveniently placed headquarters for the works fire brigade. An example of works fire brigade organisation is given on the next page and it is recommended that the works patrols be an integral part of the fire brigade, with such additional members as the circumstances of the works call for.

It is important that a log book be kept at each works or office entrance for recording the names of all callers and in the case of the workers, of all workers leaving early (the gate passes being collected) and of workers going to away jobs (despatch note being required to authorise the taking out of tools or materials).

Detailed instructions should be evolved for the patrols and all irregularities and special events recorded in the log book. The inspector of patrols should be required to report to the works manager each day in person and to submit his log book, which can be less detailed than the gate log books.

It may be remarked that the works enquiry office mentioned on page 239 does not come within the scope of works patrols, any more than does the time office. It is assumed that the gate house is not an office in the ordinary sense of making clerical records, though local conditions must settle this point.

A reference may be made to the matter of latrines, the control of which in large works is a matter of some importance. Considerable trouble is taken in some works to prevent waste of time by the workers and time recorders are sometimes used exclusively for this purpose, with fines for excess time taken above ten minutes a day.

Latrines.
p. 81.
p. 194.

A rather more dignified routine is to arrange for the issue of keys, numbered to each compartment, at some convenient point where signature is made on an autograph time recorder, the key no. being noted. A second signature is made on the return of the key. These records can be duly analysed and apparent abuse enquired into under suitable conditions of privacy. Incidentally the scheme of numbered keys can be made to serve to bring to book the small minority whose self respect is not sufficient to prevent them defacing walls, etc.

Fire Brigade Rules.
p. 51.
p. 257.
p. 263.

A specimen set of rules for the organisation and operation of works fire brigade is given below.

Works Fire Brigade Rules.

The following Rules are intended for the general organisation of the Fire Brigade, which will consist, for each shift, of Chief Fireman, Second Fireman, and 10 Firemen, together with Engineer and Electrician, under the control of the Chief Officer of the Brigade.

The Fire Brigade duties arranged for Inspector of Patrols and Telephone Operator are also subject to the discretion of the Chief Officer. Each member will be supplied with a copy of these Rules, which he will be required to carry out implicitly.

The Headquarters of the Brigade are at the Main Gate House.

All Notices will be exhibited at Headquarters, and Members must make themselves acquainted with same.

DUTIES OF CHIEF FIREMAN.

The duties of the Chief Fireman will be to instruct the Brigade in their duties, to Drill them, and take charge of all operations of the Brigade when called out for Drill. In the case of Fire he will take charge, subject to the Chief Officer's instructions. He will also take particular charge of the Nearest Hydrant.

He will see that all appliances and accoutrements including all patent Fire Extinguishers, and Fire Buckets, are kept in order and in their place, and will report monthly to the Chief Officer upon the condition and also upon the general efficiency of the Brigade.

He will not on any account open up any Hydrant without first consulting the Brigade Electrician.

He should also, in case of Fire, endeavour to be first on the spot, so that he may be able to consider the best means of extinguishing the Fire and how to save the firm's Property. If life is in danger, this must, of course, be the first consideration.

DUTIES OF SECOND FIREMAN.

The duties of the Second Fireman are to take the duties of the Chief Fireman, should he be absent. He will take charge of Second Nearest Hydrant, if Chief Fireman is present.

DUTIES OF BRIGADE ENGINEER.

The duties of the Engineer will be to keep all appliances in working order and see that a supply of Water is at all times available at the Hydrants.

Fire Instructions. At signal of Fire, at once arrange to open up Pressure Hydrant in roadway, being careful to first shut down Ordinary Meter Supply Valve.

See that Gas Supply is shut off; then get on scene of Fire ready for any emergency, such as Burst Hose.

Also have oil fuel supply shut off from Supply Tanks.

DUTIES OF BRIGADE ELECTRICIAN.

In the event of Fire, he will proceed to outbreak at once, and see that any panel or cables in the vicinity are dead before any Hydrant is opened up. He will be responsible for keeping buckets of sand and special Fire Appliances in his department ready for use at all times.

DUTIES OF INSPECTOR OF PATROLS.

In the event of fire he will arrange to have one Patrol in constant attendance at Headquarters and muster any Patrols, not on special or fire duty, outside Headquarters ready for emergency instructions. He will see that free access to each Hydrant is possible at all times.

On the alarm being given when the Works generally are closed, the Patrols **Fire Brigade** will act as Firemen, and for this reason they will be attached to the **Brigade Rules** as Firemen, attending the Drill when instructed.

DUTIES OF FIREMEN.

The duties of Firemen are to carry out all orders given by the Senior Firemen present, immediately and without question.

Each Fireman must make himself acquainted with the exact position of Hydrants, Hose-Boxes, Ladders, Lamps, &c. ; a plan giving these positions will be found exhibited at Headquarters.

Each man will be responsible for keeping clean the Hydrants, Hose and Branch under his care.

Each Hydrant and its appurtenances are to be cleaned once a week. Such cleaning may be done at any time so long as it does not interfere with the Fireman's regular work. All buckets to be cleaned weekly and kept filled.

GENERAL.

Ordinary Drills will be held at times which will be duly notified, when all Members must attend.

Turn-out and Surprise Drills at the discretion of the Chief Officer.

A Roll Book will be kept at Headquarters, in which the attendance of the Brigade at Drill will be recorded. Time Wages will be paid on the authority of the Chief Officer for time engaged on Fire Duties. Fire Duty Bonus will be paid according to circumstances.

SIGNAL CODE.

"Forward, Get to Work" : One Whistle, or Lamp waved from left to right over head.

"Turn on Water" : Two sharp Whistles, or lamp waved twice from left to right over head.

"Halt, Turn off Water" : One long Whistle, or Lamp held for continued period over head.

"Make up" : Three Whistles, or Lamp brought down and raised again

"All available hands wanted" : Four Whistles.

"Fire Call" : Fire Signal Lights on, accompanied by three short rings on Works Bells.

BRIGADE DRILL.

The Firemen will form up at Headquarters and be numbered off.

On the alarm being given, No. 1 section of three will run to Hose-box nearest to the Fire and proceed as at Drill.

No. 2 section will run to the nearest Hose-box and proceed in like manner.

The remaining Firemen will act as instructed.

Make Up.—On the signal "Make Up," all hands will assist to make up and put away gear, afterwards falling in at Headquarters as they finish.

Although written in the form of a Drill, this is the proper course to be followed at a Fire, and for practice men will be told off without numbering, taking up their duties in the order they are told off.

GENERAL RULES TO BE FOLLOWED IN THE EVENT OF FIRE.

On receipt of information of a Fire, the Telephone Operator will at once put on all Fire Signal Lights and get Works Bells rung.

Should a Fireman discover a Fire he should at once run to nearest Hydrant, push Fire-bell button, and himself proceed to run out nearest Hose, etc., and further act according to circumstances.

* During operations at a Fire, all Lamps should be kept as near the ground as possible.

Fire Brigade Rules.

At the signal of Fire, the Members of the Brigade will ascertain from nearest works telephone the position of fire immediately, and make for the scene.

The first Fireman on the scene, if no Officer is present, will take charge until Officer arrives.

If it has been found necessary to call the local Public Fire Brigade, the Patrol in charge of Works Gate will see that all vehicles are drawn away from gates, and look out for the local Firemen, so as to direct them to the quickest way to reach Fire.

All shouting to be avoided, and messages, if possible, to be carried by a Fireman.

No instructions to be taken from anyone except Officers or Firemen in charge. *This is most important.*

It must be remembered that the Brigade would have to act much as a Salvage Corps, and immediately Fire is out or under control all available hands must at once get to work to save spoilage by removing goods, mopping up water, wiping down machinery, etc., etc., under directions of Officers who would utilise any employee of the Firm, in this work, as seems best.

Members of the Brigade must at all times carry this Copy of the Rules on their person and produce same for inspection whenever called upon by the Officers to do so.

TELEPHONE OPERATOR'S INSTRUCTIONS

On receipt of information as to Fire and whereabouts, at once put on all Fire Signal Lights, get Works Bells sounded, and Ring Up in order as follows :

1. Chief Officer.
2. Electricians
3. Engineer (Department A)
4. Gate House

and advise any Works Firemen ringing up as to position of the Fire.

Await instructions before calling the Local Public Fire Brigade.

It will be necessary for each fireman's card of rules to be endorsed in the following terms to ensure his admission to the scene of the fire should the local public brigade or police be already in attendance :

To the Chief Officers in Charge of the Police or Public Fire Brigade.

The holder of these Rules is a trained Fireman in our private Brigade, and his knowledge of our Works will be useful

Please, therefore, allow him to pass to our Works situated in

For and on Behalf of

. Works Manager.

Attention on the lines of these rules will ensure hydrants and roofs being always accessible, and hose, chemical extincnteurs, and other appliances in usable condition. The position of water and gas valves and cocks should be plainly marked by prominent metal plates.

III

SOCIAL ASPECTS OF EMPLOYMENT

WIDE as is the field of works administration proper, it has at least its limits but when one comes to the social aspects of employment, there is no defining their possible extent. General Survey.

This point is borne out by the following citation from a report¹ in March 1918 on Industrial and Social Conditions in relation to Adult Education by a committee appointed by the Ministry of Reconstruction.

The terms of our reference are :

" To consider the provision for, and possibilities of, Adult Education (other than technical or vocational) in Great Britain, and to make recommendations "

We have, however, found it impossible to consider adult education apart from those social and industrial conditions which determine to a large degree the educational opportunities, the interests and the general outlook of men and women. In the course of our inquiries it has been forced upon our attention that education is hampered in many directions by economic obstacles, that industrial and social reform are indispensable, if the just claims of education are to be met, and that the full results of these reforms will be reaped only as education becomes more widespread. Material progress is of value only in so far as it assists towards the realisation of human possibilities. In considering industrial and social conditions in relation to adult education, we have not ignored economic considerations, but we have taken our stand on moral grounds. We do not think, however, that there is of necessity a fundamental antagonism between ethics and economics. Adequate pay, reasonable hours of labour, the supersession of heavy, degrading, and monotonous forms of manual labour by machinery and improved processes, the provision of holidays, the introduction of human relations and of the social motive into industry, healthy homes and a cheerful environment—these are the indispensable conditions of economic efficiency ; they are also amongst the elementary rights to which the citizen, as such, and in virtue of his responsibilities, is entitled.

Important as are the immediate and urgent economic and social questions, we think that they should be regarded from the wider point of view which we have suggested and that they should be solved with reference to the larger questions of social well-being. We realise that the effects of evil industrial and social conditions will persist after the conditions themselves are removed, and that new conditions will be reflected but gradually in new standards of life and citizenship. But while it cannot be expected that a generation which boldly attacks the defects in its social and industrial structure, and opens up possibilities of new opportunities, will itself enjoy the full results

¹Cd 9107. Extracts by permission of The Controller of H.M. Stationery Office.

LABOUR ADMINISTRATION.

[SECTION III.]

general
survey.

of its labours, nevertheless the work which has been done in the past justifies the hope that the men and women of to-day will increasingly utilize the enlarged opportunities for equipping themselves by education for the development of life and the duties of citizenship. A new era has come upon us. We cannot stand still. We cannot return to the old ways, the old abuses, the old stupidities. *The real lack in our national history has been the lack of bold and clear thinking. We have been well-meaning, we have had good principles; where we have failed is in the courage and the foresight to carry out our principles into our corporate life.*

provision of
meals.
. 81.
. 257.
. 259.

The question of canteens loomed large during the war in view of the long distances the workers lived away from their work, and in making good hot meals available for each worker an immensely valuable service was done for the State and for the worker personally.

The housing shortage and the situation of many factories must make the problem of travelling to works for years still more than a short walk so that far sighted employers are likely to continue and develop canteens where they exist and, in new works, to provide for a canteen. A sketch plan of a canteen, embodying the results of experience, is given on page 168.

Messrooms where food can be cooked, as distinct from canteens supplying cooked meals, have been a factor in works for many years.

A canteen, or for that matter a messroom, gives the opportunity for the workers running a works orchestra and giving concerts at the mid-day meal.

Mutual Aid

For years the workers have organised in many factories some form of mutual aid and this has met with employers' approval, without perhaps much tangible encouragement in the way of facilities.

. 257.

Again, subscription to hospital funds have been on an organised basis for a long time and facilities in some cases given for collection through the wages sheets instead of weekly shop collections. The employer can do much to stimulate the efficiency of these collections without the exercise of much effort. In any case the provision of facilities through the wages sheets is desirable and obviates a certain amount of wasted time if matters are left to shop collection. This question is provided for in the specimen works regulation on works auxiliary committees—page 258.

Thrift.

During the war national needs compelled attention to the cultivation of thrift, and war savings associations were prolific and mainly successful. This work is being continued to good effect. There is certainly a great gain in developing public opinion amongst workers in favour of saving as being essentially wise and not a sign either of meanness or faintheartedness as to the future.

Recreation has happily claimed a lot of attention in the more efficient works and while other employers with some justice, where adults, who ought to be able to organise for themselves, are concerned, may limit their responsibilities to looking on benevolently and giving an annual donation, the moral position is very different where young persons are employed. In their case, the employer should count their physical development as within his sphere and while there need not be insistence on doing the work under the banner of "welfare," yet it is welfare in the full sense of that word, even including its latter-day industrial application and is a legitimate attitude of grown men and women to the young. In the reference to apprentices* on page 242, mention is made of a "supervisor of apprentices," and again on page 243, of a "superintendent and instructor of apprentices." It is reasonable that the organisation of recreation both physical and mental should come under these apprentice supervisors. There remains a very small case for the label "welfare" even in this connection, though admittedly the employer is thereby taking a more generous view of his responsibilities than the law demands.

Recreation.
p. 190.
p. 259.

Many generously minded employers have already done great things for their juniors in the way of works schools and encouragement of studies, apart from other benefits. This is recognised in the following extract from the Annual Report of the Chief Inspector of Factories for 1918¹ and the report should prove stimulating to other employers who, rather than leave the provision of compulsory continuation classes as required by the Education Act 1918 to local Education Authorities, may prefer to organise works schools of their own, or, alternatively, may combine with other employers to ensure the continuation classes providing the best possible type of education. In any case employers ought to take an interest in the mental development of the young persons in their employ even where they leave the instruction wholly to the authorities.

Education of
Young
Persons.
p. 24.
p. 77.
p. 177.
p. 240.

Continuation Classes.

The new Education Act, when it comes into full operation, will effect two fundamental changes in factory organisation. It will bring to an end the half-time system of employment of children, a system which has been long condemned, but which, it should be remembered, was the first system of compulsory education. And secondly it will establish a different part-time system, under which all young persons, with certain exceptions, will after leaving school be required to attend continuation schools till they reach the age of 16 (and eventually 18) years. They will be required to attend at the classes for 320 hours each year, and the Local Education Authority may

¹Extracts by permission of The Controller of H.M. Stationery Office.

Education of Young Persons.

require that the young person's employment shall be suspended on any day when his attendance at school is required, not only during the period when he is at school, but also for such further period, not exceeding two hours, as the Authority may consider necessary, to secure that he is in a fit mental and bodily condition to receive full benefit from his attendance at school.

This is an important and drastic change. In the past only too many boys and girls have left school on their thirteenth or fourteenth birthday, and their education has come to an abrupt end. Henceforward no one will leave school till they are fourteen, and after that age all will be required to continue their education. And yet, drastic though the change may be, the need for increased education has of late rapidly come to be more and more widely recognised, and many firms have, as regards their own works, anticipated, to some extent at least, the requirements of the new Act, and have either directly or indirectly encouraged their juveniles to continue their education. It may be of interest therefore to record in a general way what has been done, and to give some details of a few typical schemes.

In the first place it is noticeable that the schemes are not restricted to any particular industry nor to any particular locality. They have, on the contrary, been started by progressive employers in all parts of the country. They are to be found in the woollen trade in Yorkshire Somerset and Wiltshire, in the cotton trade in Lancashire, in the confectionery trade in Yorkshire, London and Bristol, in the engineering trade in all parts, in printing and box-making, in soap-making in London and Lancashire, in boot factories and indeed in almost all classes of works. As a rule each firm has organised its own arrangements, but one or two interesting examples of co-operative action are reported.

Thus the Engineering Employers' Association of Huddersfield have formulated and inaugurated a scheme for facilitating the technical training of young engineers and apprentices. The results of the first year's work are highly gratifying, for 135 apprentices attended evening continuation schools and 268 attended classes at the Huddersfield Technical College. Of the latter number 66 were allowed one afternoon per week from work to attend a special apprentice class. A library of modern engineering books has been procured by the Committee (representing employers' and workers' associations) and the general expression of opinion offered by the employers is that the apprentices are taking a much deeper interest in their work and education. The number of hours spent at each class are paid for at the shop rate of wages (ordinary time) provided that the homework and progress reports are good and a first class pass is obtained; if only a second class pass is obtained 75 per cent. of the time spent at each class is paid for. The fees for the classes are also paid by the employers unless reports are unsatisfactory or a boy is guilty of serious misdemeanour at the works; gold, silver, and bronze medals are also awarded to the best students.

While however educational schemes are to be found in operation in all sorts of trades and localities, there is considerable variation in their application, in the facilities allowed, in the subjects taught, and in the general arrangements. In many cases attendance at school is compulsory and is made a condition of employment; in others attendance is voluntary, but firms offer inducements to encourage attendance. In some cases the scheme is limited to apprentices, in others it is open to all juveniles, and sometimes to adults, both male and female. Where the classes take place during the day, it is usual to pay the workers for the time spent at school, but sometimes a distinction is made between time-workers and piece-workers, the former receiving wages, the latter not. In the case of evening schools those attending are not infrequently allowed to leave rather earlier in the evening or to come in a little later in the morning without loss of pay, but the time so allowed is not as a rule equal to the time spent at the classes. In many cases all fees are paid by the employer, but not infrequently only a proportion of the fees is paid, or payment is made subject to conditions such as approval of the school attended, regular attendance (85 per cent. of attendance is commonly required), satisfactory performance of home-work, sitting for examination. Further inducements to attend are commonly offered by presentation of prize-money, and wage bonus to satisfactory pupils.

Again as regards the subjects taught considerable variation is to be found. In almost all cases however arrangements for general education are provided, which include in particular classes in English, geography, history, and com-

position. Physical drill and gymnastics are likewise an almost universal Education of feature. For girls, instruction is usually given in sewing, dress-making, Young cooking, house-wifery and domestic economy. In some cases there are also Persons. classes for drawing, painting, type-writing and shorthand. Instruction for boys is rather more varied. In addition to general subjects, they are often given technical instruction in subjects appropriate to their trade, including elementary science, electricity, mathematics, physics, machine drawing and practical work such as spinning and designing. Generally speaking a higher standard of education is provided for apprentices than for other classes of workers.

* * * * *

At one engineering works a works school has been provided for the "trade apprentices," boys who have received a good general education and enter the works before 16 years of age. Its special object is to provide for the average boy, who will probably not rise beyond the status of an ordinary workman, a course of continuation education which will assist him to become a more efficient workman than he otherwise would be. The main object therefore is to provide a trade training, but it has been found necessary, before this training can be given efficiently, to lay a foundation of general education. The course of training is divided therefore into two portions, (a) general education, (b) trade instruction. In both cases the apprentices attend school four hours a week during every week in the year.

General education is administered during the first eighteen months of the training. The instruction includes arithmetic, elementary science, drawing, English, history, laws of health, first aid and other general subjects.

Trade instruction follows on the completion of the course of general education. For the first six months the apprentices receive special training in either mechanical principles or electrical principles, according as they are to take up mechanical or electrical engineering. At the end of six months classes are formed of apprentices following specific trades, and in all some twelve classes meet, such as pattern makers, moulders, fitters, turners, armature winders, draughtsmen, etc.

The lecturing staff is composed of part-time lecturers, all of whom are employed as engineers on the works staff

* * * * *

At an engineering works at Weymouth regulations have been made requiring apprentices to attend classes at the Weymouth School of Engineering, which was set up largely at the instigation of this firm as a branch of the Technical School under the Dorset County Council.

Every apprentice is required to attend school for one day a week, between 9 a.m. and 1 p.m. and 2.30 p.m. and 5.30 p.m. They receive their usual wages for the day, but generally pay their own school fees.

In addition to this external education the firm have started an instruction room in the factory, in which each apprentice spends his first three months. The room contains a representative machine for every process performed in the works, and every boy is thoroughly instructed in the use of each machine by specially appointed mechanics whose whole time is devoted to this work of instruction. The scheme was only started recently, but the results obtained are reported to be highly satisfactory, and more than repay the expense incurred.

Another type of continuation classes, of which numerous instances might be recorded, are the evening classes of a more or less recreational kind which have been organised in a large number of works. Attendance at these classes is always entirely voluntary, and the classes are often managed by the workers themselves. Although these classes are mainly recreational they have nevertheless considerable educational value, and the subjects taught will find a place in most continuation schools. They can however hardly be described properly as continuation classes.

The following extracts from the Education Act 1918 referred to above indicates those points bearing more directly on the relation of compulsory continuation classes to employment and works schools :—

**Education of
Young
Persons.**

Education Act, 1918.¹

Subject as hereinafter provided, all young persons shall attend such continuation schools at such times, on such days, as the local education authority of the area in which they reside may require, for three hundred and twenty hours in each year, distributed as regards times and seasons as may best suit the circumstances of each locality.

Provided that—

(a) the obligation to attend continuation schools shall not, within a period of seven years from the appointed day on which the provision of this section come into force, apply to young persons between the ages of sixteen and eighteen, nor after that period to any young person who has attained the age of sixteen before the expiration of that period; and

(b) during the like period, if the local education authority so resolve, the number of hours for which a young person may be required to attend continuation schools in any year shall be two hundred and eighty instead of three hundred and twenty.

Any young person who is above the age of fourteen years on the appointed day, shall be exempt from the obligation to attend continuation schools under this Act unless he has informed the authority in writing of his desire to attend such schools and the authority have prescribed what school he shall attend.

The obligation to attend continuation schools under this Act shall not apply to any young person who is shown to the satisfaction of the local education authority to be under suitable and efficient part-time instruction in some other manner for a number of hours in the year (being hours during which if not exempted he might be required to attend continuation schools) equal to the number of hours during which a young person is required under this Act to attend a continuation school.

The local education authority may require, in the case of any young person who is under an obligation to attend a continuation school, that his employment shall be suspended on any day when his attendance is required, not only during the period for which he is required to attend the school, but also for such other specified part of the day, not exceeding two hours, as the authority consider necessary in order to secure that he may be in a fit mental and bodily condition to receive full benefit from attendance at the school: Provided that, if any question arises between the local education authority and the employer of a young person whether a requirement made under this subsection is reasonable for the purposes aforesaid, that question shall be determined by the Board of Education, and, if the Board of Education determine that the requirement is unreasonable, they may substitute such other requirement as they think reasonable.

A local education authority shall not, without the consent of a young person, require him to attend any continuation school held at or in connection with the place of his employment. The consent given by a young person for the purpose of this provision may be withdrawn by one month's notice in writing sent to the employer and to the local education authority.

Any school attended by a young person at or in connection with the place of his employment shall be open to inspection either by the local education authority or by the Board of Education at the option of the person or persons responsible for the management of the school.

¹Extracts by permission of The Controller of H.M. Stationery Office.



WORKS MANAGEMENT

IV

MATERIAL CONTROL

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IV A

MATERIAL CONTROL—INTRODUCTION

THE term *material control* has been adopted for segregating those factors in works management which have relation to materials as materials—as distinct from *production regulation* in which materials are considered only as a necessary medium of manufacture, without reference to the provision and custody of either raw material or finished work. There is, however, a species of material control integral with production regulation and the inter-relation of the two questions is therefore so intimate that the dividing line has to be drawn somewhat arbitrarily. Endeavour has been made to make the discussion under each head sufficiently complete to allow material control and production regulation to be considered as separate and distinct phases of works management.

Meaning of
Material
Control.

The main functions of material control as here conceived may be indicated as follows :

Purchasing.	Warehouse Organisation.
Stores Organisation.	Despatch.

There is a further possible function, viz. *traffic control*, which is not so much a distinct function as the centralisation under one head of the traffic elements throughout. Such a concentration is almost inevitable when there is a railway siding into the works and consequently both inwards and outwards traffic have perforce to come through the one channel. In large works, considerations of geography may compel this specialisation if the transportation system within the works is to be linked up efficiently with stores and warehouse requirements.

p. 74.
p. 326.
p. 328.

In the larger works there is room for material control being made the special function of a trained engineer with the status, say, of sub-manager. Certainly there is a very large field here which has been largely neglected and where capable attention should produce most profitable results.

IV B

PURCHASING

Purchase Specifications.
p. 284
p. 294.

THE question of the purchase specification is most important as its proper appreciation is vital to efficiency in material purchases. The preparation of these specifications calls for the most expert technical knowledge available, and the work of the drawing office in this direction may very reasonably be subjected to review by the works manager, with the personal assistance of the buyer, who ought to be qualified to know how these very definite specifications are likely to affect purchase prices.

F 54 Purchase specifications should be settled for every class of material purchased. The responsibilities as to the purchase specifications for process supplies (foundry iron, etc.) may be vested in a works chemist, and for departmental supplies (files, oil, fuel, etc.) in the works manager personally. When there is a works chemist, he may conceivably be a party to the wording of all purchase specifications.

The definite setting out of purchase specifications implies an adequate inspection or testing of the goods supplied to those specifications. In both directions, most valuable functions may be served by a works laboratory, which is the normal expression of works research department but need not stop there.

It is a very common practice to shirk both the initial specification and the inspection of the goods received, trusting to the supplier entirely, which probably means buying very inefficiently.

Efficiency in materials involves both the original purchase cost and cost entailed in utilising the material, as bought, together with physical suitability for the intended purpose. Thus with a casting, F 63, the cost of machining ought to be associated with the cost of the rough casting, when comparing low priced with high priced castings, for the advantage as to ultimate cost may easily lie with the latter. The alternative use of stampings, in lieu of castings or forgings, or, it may be, of solid bar, is all within the scope of material efficiency. In the latter connection, the amount of material wasted must not be overlooked.

The physical properties of expensive materials may, by virtue of weight saved in accomplishing a given result, make high priced material the more efficient. In another case a less expensive material in greater bulk may be the better solution. ^{Purchase specifications.}

Price per unit of quantity is no criterion of value unless the purchase specification be quite clear.

These specifications will have to allow appropriate margins or limits that will ensure the right goods being obtained. The right goods will not necessarily mean the best possible quality goods, for there may be no occasion to have such. A typical case is that of fuel, when the most efficient methods of stoking and combustion are employed, as in such a case very inferior and therefore very cheap fuel may be employed with entirely satisfactory results as to steam-raising.

Some of the elements entering into standard purchase specifications may be instanced as follows :

Physical Qualities.

Constituent parts of alloys.
Mechanical tests.
Chemical tests.

Limits of Error.

Dimensions of rolled or drawn bar.
Straightness and roundness of bar (for use in automatic machines).
Dimensions of screws, external and internal.
Pitch diameter of cast gears.
Dimensions of shafts and holes for running, driving and shrink fits.

In many instances a detailed technical specification would be unnecessary and perhaps useless, and in such cases a correctly drawn up trade description can be adopted to advantage. It must be borne in mind that descriptions commonly accepted in a given trade, as for instance brush manufacturers, are not commonly known outside that trade, so that there may be room for a good deal of investigation even when it is intended to adopt a trade description.

All standard purchase specifications should be numbered for reference, and copies be kept on hand for attachment to purchase orders. A note should be added to same to the effect that

“Our own inspection is carried out strictly to this specification.”

Quite usually material specifications are set out in the firm's catalogue of products, but such specifications are not likely to be in such a form as to serve adequately for purchasing purposes. In other cases where contracts for special products are entered into there may be material specifications embodied in the contract sufficient to control the purchasing, but even these will require converting in some measure into terms directly applicable to the firm's own method of purchasing.

Purchase Requisitions.

In the matter of purchase requisitions these will quite usually embody the purchase specifications so far as anything of the sort is attempted, though when the latter have been adequately developed this embodiment will involve no more, in the majority of cases, than a reference to a standard specification by its number.

Standardisation in materials is largely a matter of designing policy, and its bearing on efficiency in purchasing, stock control and production may be considerable.

Under most conditions materials, as purchased, come under one of two main headings, viz. special materials or ordinary stock materials.

p. 499.

Consideration of the matter is simplified by separating castings, stampings, forgings and the like under the distinctive heading of "intermediate process products"—a term designed to apply to such items when made in the works, but quite applicable to purchases.*

In the matter of special materials the distinction will lie more often in the special application or appropriation of the material than in its special nature. In some businesses ordinary stock materials will include some quite exceptional kinds.

From the point of view of control, it is convenient to requisition materials of all kinds to suit each order as it comes along, and to appropriate such material for this purpose whenever it shall be received, rather than to maintain such a stock as shall meet all requirements.

Similarly, from an accounting point of view material bought specially for any order should be allocated straight away to that order.

Material allocation, it may be remarked here, means the charging out of material to a specific order while the setting aside or earmarking of material for a particular order is better referred to as material appropriation.

With mass production conditions, or anything approaching thereto, there may be a gain in maintaining large stocks of material though even then there will be economy in purchasing to suit each stock

F 57. production sanction, or estimated requirements for a given period.

The locking up of capital in stock will, apart from questions of buying ahead in a favourable market, be justified according as production is facilitated by material being always available; for to have material ready when wanted is a vital condition of production efficiency. It is very doubtful if this should be effected by holding large stocks, but rather that the organisation should be such as to ensure the proper material being requisitioned, purchased and delivered in good time.

There is another consideration to be kept in view, namely the prompt replacement of defective material and provision for meeting other emergencies, such as customers' demands for replacement parts. Purchase Requisitions. p. 298.

The best compromise, in the ordinary way, will be to first aim at standardisation of material and then to hold reserve stocks in these standard lines sufficient to meet emergencies. After that as each order, whether for special or standard product, is put in hand steps must be taken immediately to obtain appropriate supplies of material. F 56.

The most convenient procedure, to this end, is to extend the list of parts or assembly list into a list of quantities for each order by means of attached slips, as previously mentioned, and prepare purchase requisitions with schedules of delivery dates necessary to meet production schedules. p 100. F 48. F 53. F 54 F 52.

These requisitions can be supplemented by the quantity necessary to provide a reserve stock to meet emergencies of replacements and spare parts in accordance with the dictates of experience and the balance already available in the general stores.

The works office through its production department will be the best channel, normally, for preparing all purchase requisitions directly relative to product. The head of the production department could be known as the *production regulator*. p. 149

When the drawing office prepares the purchase requisition, as may be desirable in such cases as auxiliary equipment bought out finished, the assembly list should be marked accordingly, to obviate confusion.

The naming of delivery dates on each purchase requisition is very important in regard to making it possible for the general stores to get material delivered in accordance with production requirements without periodic panics, but considerable knowledge and judgment is necessary for specifying the dates with any approach to accuracy.

Having gone to the trouble of planning the dates for delivery, the importance of adhering to these dates must be impressed on the supplier. F 80.

Purchase requisitions will be also necessary for those materials that do not concern the drawing office or even the works office, and these will usually be best dealt with as to process supplies and auxiliary supplies by the storekeeper, and as to tools and plant by the works superintendent.

The approval of all purchase requisitions is usually vested in the works manager, irrespective of his responsibility or otherwise for actual buying, and obviously this control ought to be exercised

Purchase Requisitions.

at the requisition stage rather than attempted when passing the purchase orders necessary for executing the requisition.

There is usually room for criticism to be given to the total quantity requisitioned for a given order. If the foreman inspires the settlement of quantity he will naturally aim at getting a margin for eventualities. This may be sound enough so long as the excess is not issued without due report on the causes entailing extra material to be drawn from store.

The production estimator should be qualified to act as referee where the foreman and the production office disagree on such points.

Another point to be provided for in the requisition stage is that there shall be no overlapping of requisitions for the same goods. Purchase requisitions need, therefore, to be reviewed by the storekeeper, though under proper administration and organisation the risk of overlapping may be so small as to be left out of the routine of purchasing, that is, the purchase requisition may pass direct from the production office to the works manager and thence to the buyer. A carbon copy of each requisition can be passed to the storekeeper for him to review as to overlapping (reporting accordingly without delay), and for holding against the arrival of a copy of the purchase order. The storekeeper becomes then in a position to look out for purchase orders not being held up unduly, having regard to the delivery requirements specified on the requisition.

With buying done directly under the works manager, it is feasible for the buyer to proceed with his price enquiries while the purchase requisition is in process of authorisation by the works manager.

Purchase Orders
p. 18.
p. 23.

Reference has been made above to the functions of a buyer, and incidentally to the conditions for efficient purchasing.

Apart from the personal qualifications of the buyer, there must be preparatory work done before he comes into the matter.

p. 445 F 54 Promptitude in the preparation of purchase requisitions and the inclusion on same of delivery requirements will enable the buyer to know how far he may go in the sending out of price enquiries.

F 14- A date for sending in quotations should be stated on each enquiry.

Any quotations already obtained for the making up of sales tenders, that are ultimately accepted, should be duly considered by the buyer.

It will be usually left to the supplier to make offers as to delivery, and this must influence the buyer's selection of the most favourable quotation. Where the delivery offered at the lowest price is not within the requirements of the purchase requisition, it is advisable

F 15. to negotiate on this point before placing the purchase order so that

there may be the less fear of difficulty in obtaining the right **Purchase Order.** delivery.

The selection of the most favourable quotation is not necessarily a question of price or delivery, as reliability or suitability of the goods quoted for is hardly less important than delivery, and may be more important than price.

These several factors tend to the placing of purchase orders of a given kind in relatively few directions unless the quantities involved in the course of a year are large enough to allow further partition of the orders without reducing the value of the business to any supplier below the point at which it is likely to command adequate attention.

No firm can afford to be absolutely positive that they are already buying in the best market, and to that end it should be the buyer's business to give a fair hearing to all who may reasonably be supposed to be in a position to supply the firm's requirements.

Really competitive quotations can only be obtained when business is distributed in some degree at least.

The practice of playing off one competitor against another by disclosing competitive prices, whether partially or wholly, is hardly straightforward, to say the least, and it is very doubtful if the cut obtained in prices by these underhand means is really the smart buying it is vaunted to be, if delivery, quality and future relations are duly taken into account. In certain materials, rings to fix prices have been formed among the manufacturers, though the liberty of reducing the prices on large contracts is sometimes reserved by the members of the ring.

Another aspect of buying is the placing of contracts for supplies over a given period. Such contracts may prove distinctly economical for regular supplies of every character where otherwise the individual orders might be too small to command the best terms. Another class of important contracts will be for finished products that have to be bought outside, though in this direction substantial minimum quantities may have to be guaranteed to get any marked advantage in price, and this is not always a safe undertaking unless designs are thoroughly established.

The necessity for a contract note instead of the ordinary purchase order will depend on the nature of the business, and the example given on the next page will suggest the character of the provisions to be embodied in an ordinary contract note.

Where the undertakings are on a large scale, there may be a further development necessary in the form of contract by having a third party to the contract, namely "The Sureties," to meet the obligations falling on the contractor should he fail to do so.

**Purchase
Orders.****CONTRACT NOTE.**

..... (hereinafter called the Buyers), and..... (hereinafter called the Sellers), at the prices and subject to the conditions hereinafter contained. The said conditions form an essential part of the contract and are agreed to by the Sellers in consideration of the order.

CONDITIONS.

Period of Contract.	This Contract No.	To date from
Description.	19	19

Quality The said articles shall be in materials, workmanship and in every other respect equal and answerable to the standard samples deposited at the Buyers Offices, and in case the Buyers shall at any time be of opinion that any of the said articles delivered are not equal in quality and all other respects to the articles intended by this Contract, it shall be lawful for the Buyers to reject the same as defective.

Quantity.

Increased Quantity. The Buyers have the right to take an increased number of the articles described over and above the foregoing quantity specified up to a maximum of..... such excess deliveries to be subject in all respects to the terms described herein.

Price

Delivery. The said articles shall be delivered by the Sellers at such place or places in London and at such time or times as shall be specified in the order or orders given from time to time by the Buyers, and in such quantities as shall from time to time be required by the Buyers and free from all charges for packing, carriage, delivery or otherwise whatever. Packages to be returnable

Terms of Payment. Subject to $3\frac{1}{2}$ per cent for cash in seven days from the date of delivery, or $2\frac{1}{2}$ per cent. on payment during the month following delivery.

Defective Articles. The Buyers may exercise the option of deducting all defective articles from the quantity contracted for, and to debit the Sellers with the original value of the articles. Or, they may require the whole of the articles replaced within..... days, from the receipt of such defective articles by the Sellers, and debit them with all expenses (carriage) incurred. The buyers furthermore reserve to themselves the right, should supplies of defective material be general, to cancel the whole or any portion of the Contract

Stoppages. In the event of stoppage of work owing to fire, tempest, breakdown, or accidents, trade disputes, lock-outs, strikes, or other combinations of workmen, or any other unforeseen occurrence beyond the Sellers' control, deliveries may be wholly or partially suspended until work is resumed under normal conditions

Notice and proof of such unforeseen occurrence to be given by the Sellers in writing within three days of such stoppage, and the period of the stoppage of the Sellers' works from any of the above causes to be added to the contract period of delivery

But the Buyers have the option to cancel at their own discretion that portion of the deliveries so delayed instead of accepting postponed deliveries.

**Liquidated
Damages for
late and
Non-Delivery.**

The Buyers reserve the right to deduct as liquidated Purchase damages.....per cent. of the value in respect of all Orders. articles not delivered as per official orders for every..... days delay or part thereof after the.....day following the date of the orders, and such amount may be deducted from next payment due.

New Tools.

Whenever new tools are used, samples to be made and submitted to the Buyers for their approval, and no more articles are to be made from these new tools until the samples have been approved in writing by the Buyers.

.Dated this.....day of.....19

(Signature).....

Examples of possible further clauses may be quoted by way of suggestion.

The Sellers in carrying out this contract shall pay the rate of wages and observe the hours of labour recognised or agreed upon between the Trades Unions and the Employers in the locality in which the work for carrying out the Contract is to be completed, and the Sellers shall not transfer, assign or underlet directly or indirectly this Contract or any part share or interest therein without the written consent is given of the Buyers, and that in case such consent is given the Sellers shall be responsible for all work done by any such sub contractor and for its being carried out under the same conditions as if executed by the Sellers.

The Buyers shall have the option of paying by bills and when this option is exercised, the charges incurred in connection with the discounting of the bills shall be borne by the Buyers.

In the event of the Buyers failing to pay any of the accounts as agreed, or becoming bankrupt, or committing an act of bankruptcy, the Sellers without prejudice to any claim they may have for damages shall have the right to suspend delivery hereunder, and to cancel this Contract, without giving rise to any claim for compensation on the part of the Buyers.

The Buyers have the right to cancel this Contract at any time in the event of the Sellers, or any agent or official of the Sellers, giving or offering to give, any present, or conferring a benefit of any kind on any official connected with the Sellers, as an inducement to obtain any order from the buyers, or as a reward for having obtained, or being instrumental in obtaining an order.

In this matter of secret commission, the Prevention of Corruption Act, 1906, provides for certain penalties under the law—the maximum penalty being imprisonment with hard labour for two years, coupled with a fine of £500. Some firms have considered it desirable to display a notice for the staff to the effect that anyone giving or receiving commissions or presents, unless with the knowledge and consent of the directors, will be liable to proceedings under the act, and although this may seem to reflect on the integrity of the staff and cause resentment if issued as a special notice, it is quite reasonable to include the point in the general regulations for the staff.

Quite frequently there will be a convenience in issuing petty purchase orders under a lesser authority than that necessary for ordinary purchase orders. In this case a limit of say £1 may be indicated on the order form and plain instructions given on same to the supplier to refer back, if the value of goods ordered exceeds this amount. In some instances, all orders above £50 in value have to

**Purchase.
Orders.**

be signed by the managing director, but this is the wrong way round to control expenditure. Control of this character should be exercised when the purchase requisition is being passed.

**Sale of Goods
Act.**

By way of reminder of some of the conditions attaching to selling, and therefore to buying, some extracts are given below from the Act dealing with the subject and these will repay close examination.

Extracts from the Sale of Goods Act, 1893.¹

p. 276.

Where there is a contract for the sale of goods by description, there is an implied condition that the goods shall correspond with the description; and if the sale be by sample, as well as by description, it is not sufficient that the bulk of the goods corresponds with the sample if the goods do not also correspond with the description.

Subject to the provisions of this Act and of any statute in that behalf, there is no implied warranty or condition as to the quality or fitness for any particular purpose of goods supplied under a contract of sale, except as follows:

(1) Where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, so as to show that the buyer relies on the seller's skill or judgment, and the goods are of a description which it is in the course of the seller's business to supply (whether he be the manufacturer or not), there is an implied condition that the goods shall be reasonably fit for such purpose, provided that in the case of a contract for the sale of a specified article under its patent or other trade name, there is no implied condition as to its fitness for any particular purpose:

(2) Where goods are bought by description from a seller who deals in goods of that description (whether he be the manufacturer or not), there is an implied condition that the goods shall be of merchantable quality; provided that if the buyer has examined the goods, there shall be no implied condition as regards defects which such examination ought to have revealed:

(3) An implied warranty or condition as to quality or fitness for a particular purpose may be annexed by the usage of trade:

(4) An express warranty or condition does not negative a warranty or condition implied by this Act unless inconsistent therewith.

Where, in pursuance of a contract of sale, the seller is authorised or required to send the goods to the buyer, delivery of goods to a carrier, whether named by the buyer or not, for the purpose of transmission to the buyer is *prima facie* deemed to be a delivery of the goods to the buyer.

p. 327.

Unless otherwise authorised by the buyer, the seller must make such contract with the carrier on behalf of the buyer as may be reasonable having regard to the nature of the goods and the other circumstances of the case. If the seller omits so to do, and the goods are lost or damaged in course of transit, the buyer may decline to treat the delivery to the carrier as a delivery to himself, or may hold the seller responsible in damages.

p. 53.

Unless otherwise agreed, where goods are sent by the seller to the buyer by a route involving sea transit, under circumstances in which it is usual to insure, the seller must give such notice to the buyer as may enable him to insure them during their sea transit, and, if the seller fails to do so, the goods shall be deemed to be at his risk during such sea transit.

Where goods are delivered to the buyer which he has not previously examined, he is not deemed to have accepted them unless and until he has had a reasonable opportunity of examining them for the purpose of ascertaining whether they are in conformity with the contract.

Unless otherwise agreed, when the seller tenders delivery of goods to the buyer, he is bound, on request, to afford the buyer a reasonable opportunity of

¹ By permission of the Controller of H.M. Stationery Office.

examining the goods for the purpose of ascertaining whether they are in conformity with the contract. **Sale of Goods Act.**

The buyer is deemed to have accepted the goods when he intimates to the seller that he has accepted them, or when the goods have been delivered to him, and he does any act in relation to them which is inconsistent with the ownership of the seller, or when after the lapse of a reasonable time, he retains the goods without intimating to the seller that he has rejected them. **p. 293.**

Unless otherwise agreed, where goods are delivered to the buyer, and he refuses to accept them, having the right so to do, he is not bound to return them to the seller, but it is sufficient if he intimates to the seller that he refuses to accept them.

Where any right, duty, or liability would arise under a contract of sale by implication of law; it may be negatived or varied by express agreement or by the course of dealing between the parties, or by usage, if the usage be such as to bind both parties to the contract

After the purchase orders have been placed the question of **Urging Deliveries.** following up deliveries arises, as it is not always sufficient to merely specify to the supplier the dates on which delivery is required. **p. 151.**

The buyer in close collaboration with the storekeeper should deal with the urging of materials from start to finish, the works manager signing all correspondence. The storekeeper's copies of purchase orders should be endorsed with deliveries made and note made as to any urging steps taken. It should not be necessary for the buyer to duplicate this information if he goes to the storekeeper's file each day and dictates his correspondence on the spot. **F 81**

Explicit but reasonable instructions as to delivery at the time of placing the order constitutes the necessary preliminary to getting deliveries when required.

The next stage is to send a reminder, possibly in the form of a postcard, to the supplier, a few days, varying according to the class of order, before the date on which delivery is expected. Orders for stock articles, if in stock, will have been filled before any question of reminder arises. **F 80.**

When the delivery or due date arrives, and after allowing a small margin for the goods or the advice to come to hand, a schedule should be sent forthwith of quantities overdue. These schedules should be continued weekly with amendments as to further deliveries falling due and as to goods actually received. This routine may have to be supplemented by letters, telegrams and the usual means adopted for impressing the supplier with the importance of delivery.

Under some circumstances it will pay to send out a special representative to call on the suppliers with whom orders have been placed. In adopting this plan, however rarely, the representative should insist on being shown the work in progress, and should be technical enough to appreciate the prospects of delivery promises being kept.

The routine of reminder cards and weekly schedules of deliveries

**Urging
Deliveries.**

overdue, supplemented with correspondence, will be found much more effective than sending formal urging forms, which are sent out too generally to be taken very seriously.

In laying down a plan of deliveries of material required, and getting the supplier to live up to it, an objection may be urged to the increased administrative expense involved, for work of this character requires intelligent and continuous application.

The justification must lie in the increased production efficiency attained by these means. The fact that in some cases, the placing of a purchase order with a hackneyed formula as to delivery, "soon as possible," or it may be "urgent" (some firms even issue a separate series of purchase orders designated as urgent orders), brings the goods in sufficiently early does not discount the necessity for taking no chances in the matter.

Every failure in the supply of material at the right moment, or even before the right moment as regards being actually put into work, means a loss of output far outweighing the expense of taking every reasonable step to prevent its occurrence.

[IIr—p. 150—Work Depot Routine.]
[IV D—p. 315—Warehouse Organisation.]
[V c—p. 371—Stock Accounts.]
[V H—p. 386—Stocktaking.]

IV c

•STORES ORGANISATION

ANY goods held within a stores, whether in the form of raw materials, auxiliary supplies, castings, forgings, finished components, or even assembled product, are covered by the term stock to the extent to which the items have been included in their existing form under the heading of stock in the works accounts. **Meaning of Stock.**

The meaning of the term auxiliary supplies above mentioned is fairly obvious, but may be more specifically defined as covering the materials or goods required for use in a works that do not enter directly into the product as sold. The dividing line is clear enough as to the great majority of items, but it is quite possible to have goods that may either enter into the product as sold or be used for general works purposes. Jointing material, for instance, is of such a character, and convenience would probably classify it under auxiliary supplies in most works.

p. 465.

At the end of the financial year, work-in-progress or in course of manufacture under specific orders, constitutes an element of stock so far as the balance sheet is concerned, but work-in-progress does not come within the category of stock as at present under discussion.

It is not an uncommon practice for the term "stores" to be applied to raw materials and auxiliary supplies, and, in the sense that one might refer to, say, a ship's stores, the term has a well-accepted meaning.

It is, however, held here that the term "stores" should have reference to the place in which stock of any kind is kept, rather than to the stock or any particular portion of the stock contained therein.

Following from this, it is necessary, in passing, to make clear that the term "stock" should not have particular reference to finished factory product, as is sometimes the case, but be all-embracing as to any goods held in stock.

Meaning of Stock.

"Goods" is used here instead of the more common term "materials," as allowing a wider interpretation, so as to cover machinery, for instance.

Local conditions must regulate the lines to be followed in organising a stores system, but there are a number of principles that will apply in at least the majority of cases.

Stock Classification.

The stock as a whole may usually be divided under two headings, viz. general stock and component stock, leaving the question of saleable stock of complete product and spare part as a matter for warehouse organisation, Section IV D. The divisions will usually comprise the following group :

General Stock.

Raw Material
Auxiliary Supplies.
Standard Fittings.

Component Stock.

Rough Components.
Finished Components for assembling.

Each factory has its peculiar range of stock and its own conditions of storage to meet, but allowing for all that, it will be helpful to consider the lines of classification likely to apply in average cases.

In a classification list of general stock, the underlying idea should be to group together the items likely to be stored in proximity to each other.

The main grouping for general stock may therefore be set out as follows :

Raw Material.	Iron and Steel. Non-Ferrous Metals. Non-Metallic Materials. Timber.
Auxiliary Supplies.	Building Supplies. Electrical Supplies. Engineers' and Pipe-Fitters' Supplies. Foundry Supplies. Fuel and Spirits. General Sundries. Hardware Sundries. Implements and Utensils. Liquids and Greases. Painting Materials. Stationery and Paper.
Standard Fittings.	Fittings and Components. Bolts and Fastenings.

It is of primary importance that the classification scheme adopted as the basis of an identification system within the stores should be serviceable also for stock account purposes.

The classification will require to be developed if every variety and size of article is to be identified by numbers and symbols.

The necessity for such development will depend on many factors, ^{Stock} not the least important being the capacity of the storekeeper to ^{Classification.} properly utilise such methods.

Even where there may be no present intention of applying the classification scheme to identify the stock by labelling the bins in accordance therewith, there can be no objection to adopting for the stock accounts a system capable of this application. There is the further point that for stock control purposes in the stores a purely alphabetical sequence of records does not afford the help that logical grouping can.

Alphabetical sequence is, however, quite advantageous when restricted to a group of related goods.

In the specimen classification list of general stock given on the following pages, alphabetical order has been adopted in the respective groups. By this arrangement, anyone familiar with the general scheme of the classification can use the list readily without any cross indexing. The scheme of classification nos. provided for is the linking up of group no. and item no. thus : Teak is 4/18.

A practice sometimes adopted of numbering the stock accounts to correspond with the bin numbers involves a cross index as bulky as the list of bin numbers and, more important, hinders logical arrangement of storage, although the stores server finds it easy to add bin numbers to the vouchers.

The specimen classification does not deal with component stock, as this is necessarily peculiar to each business. The component references adopted for production purposes will determine this point. It may be remarked that code words, when suitably ^{p. 95.} arranged in alphabetical groups for each type of catalogued ^{p. 316.} products, can be usefully employed sometimes for identifying saleable product, held in the warehouse.

Any class may include several sizes or varieties of articles bearing the same name, though the class number soon loses its identification if the varieties included are substantially different articles apart from size.

Sub-class references for the different varieties or sizes may be formed by the affixing of letter references.

One reason for advocating a number reference for stock records, ^{F 89} in place of a name reference, is to obviate the difficulty arising ^{p. 312.} from the use of different names for the same article. In the classification list as issued in any factory, possibly in the form of a blue-print, local alternative names may be added, if thought necessary, to the name adopted for classification purposes. ^{F 123.} ^{F 124.}

Stock
Classification.

SPECIMEN CLASSIFICATION.

*General Stock—Raw Materials.***1. Iron and Steel.**

- Bar.* 1. Iron, Cast.
2. " Common.
3. " Lowmore.
4. Steel, Cast.
5. " High Speed.
6. " Mild, Black.
7. " Mild, Bright.
- Ingot.* 10. Iron, Pig.
11. Steel, Blooms.
12. " "
- Scrap.* 20. Iron, Cast.
21. Steel & Wrot. Iron, Plate.
22. " " " Swarf.
- Sections.* 30. Steel, Angle.
21. " Channel.
32. " Joist.
- Sheet & Plate.* 40. Iron, Galvanised.
41. Steel, Cast.
42. " Lacing.
42. " Mild.
42. " Spring.
45. " Tinned.
- Tube.* 50. Steel, Solid Drawn.
51. Wrot. Iron, Gas.
52. " " Steam.
- Wire.* 60. Iron, Black.
61. " Galvanised.
62. Steel, Cast Silver.
63. " Mild.
64. " Piano.
65. " Spring.
- Wire Rope.* 70. Steel, Galvanised.
71. " Plain.

2. Non-Ferrous Metals.

- Bar.* 1. Brass, Brazing.
2. Copper, Soft Rolled.
3. Gunmetal, Cast.
4. Manganese Bronze, Hard Rolled.
5. Phosphor Bronze, Rolled.
- Ingot.* 10. Aluminium.
11. Antimony.
12. Copper.
13. Gunmetal.
14. Lead.
15. Manganese Bronze.
16. Phosphor Tin.
17. Spelter.
18. Tin.
19. White Metal.
- Scrap.* 20. Aluminium.
21. Brass.
22. Copper.
23. Gunmetal.
24. Manganese Bronze.
25. Phosphor Bronze.
26. White Metal.

2. Non-Ferrous Metals (Contd.)

- Sections* 30. Brass Strip.
Sheet & Plate. 40. Brass.
41. Copper.
42. Lead.
43. Tin.
44. Zinc.
45. Zinc.
- Tube.* 50. Brass.
61. Copper.
- Wire.* 60. Brass.
61. Copper.
62. Lead.
63. Phosphor Bronze.
- Wire Gauge.* 70. Brass.
71. Copper.

3. Non-Metallic Materials.

1. Asbestos, Cord.
2. " Millboard.
3. Canvas.
4. Ebonite, Rod.
5. " Sheet.
6. Felt.
7. Fibre, Red Vulcanite, Rod.
8. " " " Sheet.
9. Leather.
10. Line, Marline.
11. " Sash Cord.
12. " Spun Yarn.
13. " String.
14. " Tarred Flax.
15. Rope, Manila.
16. " Tarred Hemp.
17. " White Cotton.
18. Rubber Hose.
19. " Sheet.

4. Timber.

1. Ash.
2. Beech.
3. Birch.
4. Boxwood.
5. Deal, Yellow.
6. " White.
7. Ebony.
8. Elm.
9. Larch.
10. Lignum Vitae.
11. Mahogany.
12. Maple.
13. Oak.
14. Pine, Pitch.
15. " Red.
16. " Yellow.
17. Spruce.
18. Teak.
19. Walnut.
20. Whitewood.

SPECIMEN CLASSIFICATION.

Stock
Classification.*General Stock—Auxiliary Supplies.***10. Building Supplies.**

1. Bricks, Fire.
2. " Ordinary
3. Cement.
4. Corrugated Iron Sheet.
5. Fire Clay.
6. Glass, Sheet.
7. Lino.
8. Pipes and Guttering, Earthenware.
9. Pipes and Guttering, Iron, Cast.
10. Pipes and Guttering, Iron, Galvanised Sheet.
11. Pipes and Guttering, Lead.
12. Pitch.
13. Putty.
14. Roofing Felt.
15. Sand.
16. Size, Concentrated.
17. Slates.
18. Tar.

11. Electrical Supplies.

1. Arc Lamps, Carbons.
2. " Spare Parts.
3. Cable.
4. Cds. Le Clanché.
5. Cuts.
6. Flexible Cord.
7. Fusible Plugs.
8. Incandescent Lamps.
9. " Fittings.
10. Insulating Tape.
11. Mica.
12. Terminals.

12. Engineers' and Pipe-fitters' Supplies.

1. Belting, Flat Tanned, Single.
2. " " Double.
3. " Rawhide.
4. " Round Leather.
5. Belt Dressing.
6. " Fasteners.
7. " Laces.
8. Gas Burners.
9. " Fittings.
10. " Globes.
11. " Mantles.
12. Gauge Glasses.
13. Leathers, Hydraulic.
14. Packing, Engine.
15. " Hydraulic
16. Pipe—W.I.—Gas
17. " —Steam.
18. Pipe Connections—Back Nuts.
19. " —Bends.
20. " —Crosses.
21. " —Elbows.
22. " —Flanges.
23. " —Nipples.
24. " —Plugs.
25. " —Sockets.
26. " —Tees.

13. Foundry Supplies.

1. Charcoal.
2. Coke, Foundry.

13. Foundry Supplies (Contd)

3. Canister.
4. Limestone.
5. Loam.
6. Sand, Foundry.
7. Straw Rope.

14. Fuel and Spirits.

1. Coal, Household.
2. " Smithy.
3. " Steam.
4. Coke, Gas.
5. Firewood.
6. Methylated Spirit.
7. Petrol.

15. General Sundries.

1. Alum.
2. Bath Brick.
3. Black Lead.
4. Borax.
5. Candles.
6. Case-hardening Composition
7. Chalk, French.
8. " White Lump.
9. Cleaning Cloths.
10. Corks.
11. Disinfectant Powder.
12. Emery Cloth.
13. " Discs.
14. " Powder.
15. Glass Paper.
16. Glue.
17. Graphite.
18. Gum Arabic.
19. Hazel Rods.
20. Hessian.
21. House Flannel.
22. Lamp Wick.
23. Matches.
24. Metal Polish.
25. Potash.
26. Pumice Stone.
27. Rags.
28. Resin.
29. Sal Ammoniac.
30. Salt.
31. Saltpetre.
32. Shellac.
33. Soap, Household.
34. " Soft.
35. " Toilet.
36. Soda.
37. Solder.
38. Soldering Paste.
39. Sulphur, Flour.
40. Towels—Hand.
41. " —Roller.
42. Waste, Cotton.
43. Wax.
44. Welding Composition.
45. Whiting.
46. Wipers.

16. Hardware Sundries.

1. Brackets, Japanned Wrot. Iron.
2. Chain, Brass, Chandeller.
3. " Steel, Black Japanned.

Stock
Classification

SPECIMEN CLASSIFICATION.

General Stock—Auxiliary Supplies, contd.

16. Hardware Sundries (Contd.)

4. Chain, Steel, Solid Twisted
Curb Link.
5. Coach Screws
6. Dowels, Brass Screw Plugs.
7. " Brass Screw Sockets.
8. " Malleable Iron.
9. Drawer Pulls, Brass.
10. Drawer Pulls, Brass, Combined
Pull and Card Holders.
11. Drawer Pulls, Iron, Japanned.
12. Hinges, Butt, Brass.
13. " Butt, Iron.
14. " Strap, Iron.
15. Hooks, Hat and Coat, Jap'd.
16. Hooks and Eyes, Cabin, Brass.
17. Knobs, Japanned.
18. Letters and Figures, White Metal.
19. Locks, Brass, Till and Cup-
board
20. " Iron, Tile and Cupboards.
21. " Iron, Padlock.
22. Nails, Brass Panel Pins.
23. " Copper Nails.
24. " Steel Brads.
25. " Steel Cut Nails.
26. " Steel Tacks.
27. " Steel Wire Nails.
28. " Steel Wire Points.
29. Rapping Plates.
30. Rivets, Copper
31. " Iron, Charcoal.
32. " Iron, Common.
33. " Iron, Lowmoor.
34. Screw Eyes.
35. Screw Hooks.
36. Staples, Galvanised
37. Wood Screws, Brass, Csk. Hd.
38. " " Brass, Rd Hd.
39. " " Iron, Csk. Hd.
40. " " Iron, Rd Hd.
41. Wood Screw Cups

17. Implements and Utensils.

1. Bellows.
2. Bottles, Glass.
3. Brooms, Birs.
4. " Hair.
5. Broom Handles.
6. Brushes, Banister.
7. " Circular.
8. " Duster.
9. " Paint.
10. " Sash Tool.
11. " Scrubbing.
12. " Stencil.
13. " Tar.
14. " Water.
15. " Wire.
16. Cans, Drip.
17. " Oil.
18. " Water.
19. Chisels.
20. Crucibles.
21. Drills.
22. Emery Wheels.
23. Files, Flat Hand.
24. " Half Round.
25. " Round.
26. " Square.
27. " Three Square.
28. Warding.
29. File Cards.
30. File Handles.
31. Forks, Coke.

17. Implements and Utensils (Contd.)

32. Gloves, Stokers'.
33. Goggles.
34. Hammers, Hand.
35. " Lead.
36. " Sledge.
37. Hammer Handles.
38. Knives, Shoemakers'.
39. Ladles.
40. Lamps, Tin Hand.
41. Mallets, Boxwood.
42. " Hide.
43. " Hide Refills.
44. Mats.
45. Mops, Household.
46. Oil Feeders.
47. Palls.
48. Paint Kettles
49. " Strainers.
50. Pliers.
51. Polishing Bobs.
52. " Mops.
53. Punches, Leather.
54. Sacks, Coal.
55. Saws, Band.
56. " Circular.
57. " Hack.
58. Screw Drivers.
59. Shovels
60. Soldering Irons.
61. Sieves
62. Spanners, Adjustable
63. " Double Ended.
64. Squeegees.
65. Syringes.
66. Taps.
67. Vice Clamps, Copper.
68. " " Lead

18. Liquids and Greases.

1. Acid, Nitric.
2. " Sulphuric
3. Cutting Compound.
4. Disinfectant, Liquid.
5. Grease, Anti-Corrosive.
6. Oil, Castor.
7. " Cleaning.
8. " Colza
9. " Cylinder
10. " Linseed, Boiled.
11. " Linseed, Raw.
12. " Lard.
13. " Olive.
14. " Paraffin.
15. " Rangoon.
16. " Rape.
17. " Sperm.
18. " Shafting.
19. Tallow.

19. Painting Materials.

1. Colours, Dry, Miscellaneous.
2. " " Red Lead.
3. Colours-in-oil, Miscellaneous.
4. " " White Lead.
5. Colours-in-turp, Miscellaneous.
6. Dryers.
7. Paint Remover.
8. Turpentine.
9. Varnish, Anti-Corrosive.
10. " Copal.
11. " Japan (Gold Size).
12. " White Hard Spirit.

SPECIMEN CLASSIFICATION.		Stock Classification.
<i>General Stock.</i>		
<i>Auxiliary Supplies, contd.</i>	<i>Standard Fittings. (F 39)</i>	
20. Stationery and Paper. 1. Adhesives. 2. Blotting Paper. 3. Carbon Paper. 4. Cards, Guide. 5. " Record. 6. Drawing Paper. 7. Envelopes. 8. Erasers. 9. Ink. 10. Labels, plain 11. Memorandum Books and Pads. 12. Paper Fasteners. 13. Pen Holders. 14. Pen Nibs. 15. Pencils. 16. Photo Paper 17. Rubber Bands and Sorters 18. Sanitary Paper, Loose 19. " " Rolls 20. Strawboard, Corrugated 21. String 22. Tracing Paper. 23. Typing Paper 24. Wrapping Paper, Brown. 25. " " Oiled. 26. Writing Paper.	30. Fittings and Components. 1. Balls. 2. Ball Bearings. 3. Cocks, Gland. 4. " " Pet. 5. " Plug. 6. " Stop 7. Lubricators, Grease Cups, " Screw Down. 8. " Needle. 9. " Oil Cups, Sliding " Lid. 10. Name Plates, Cast 11. " " Etched. 12. Taps, Rib 13. " Stop. 14. Unions, Plumbers'. 15. Valves, Check. 16. " Globe. 40. Bolts and Fastenings. 1. Bolts, Steel, Bright. 2. Bolts and Nuts, Black Faced. 3. " " Galvanised. 4. Cotter Pins, Brass, Split. 5. " " Steel, Split. 6. " " Steel, Taper. 7. Keys, Parallel 8. " " Taper 9. Nuts, Brass Hexagon. 10. " " Steel Hexagon, Black. 11. " " Steel Hexagon, Bright. 12. " " Steel Hexagon, Castellated. 13. " " Steel Hexagon, Lock. 14. " " Steel Hexagon, Turret. 15. Screws and Set Pins, Brass. 16. " " " Iron 17. Studs, Steel. 18. Washers, Brass. 19. " " Copper Asbestos. 20. " " Felt. 21. " " Iron, Black. 22. " " Leather. 23. " " Spring 24. " " Steel, Bright.	

When goods are received the primary questions of routine are the collection of the goods, the checking and inspection, handing over to or advising of department interested in the receipt, and reporting the receipt for accounting purposes. Material Receipt. p. 285.

The collection of goods by motor vehicle is being increasingly undertaken by manufacturers as delivery by the railway companies to the works tends to get dearer relatively as well as positively. p. 328.

When collection from the railway stations is undertaken, proper records of goods collected must be kept for the purpose of obtaining rebate from the railway company concerned. The danger of careless signature by the collecting carmen must be guarded against, and it p. 326.

**Material
Receipt.**

will be advisable for the signatures at the station to be checked by the receiving clerk against the collection sheets every other day at least.

p. 276.

The necessity for inspection, except of a superficial character, is not always recognised, and goods are frequently passed into stock on the reputation of the supplier, and not always even with that support. Some items such as wood screws will hardly require much inspection, and being duly packeted in small cartons any fault discovered in using the screws could be fairly easily proved at a later date. Other items that are supplied loose and possibly obtained from various sources are not merely difficult to identify afterwards, but the fault when discovered might seriously dislocate production in some direction. Instances of this sort will be bolts and nuts, which are not always produced within the limits requisite for interchangeability—whether coarse or fine limits, the limits exist and must be recognised. Adequate viewing or gauging on receipt is the only right course to adopt, and this ought not to involve excessive work. The list given on page 293 of standard fittings will suggest other items requiring viewing as to dimensions.

Some items, such as castings, require a surface examination by a skilled observer, as distinct from viewing, but this ought to be much more than the merely superficial examination usually sufficient for accounting purposes.

The necessity for physical and chemical tests from test bars of materials purchased are most frequently determined by the requirements of the inspector acting for the customer. These tests do not, however, constitute as infallible an index of strength and suitability of the material when worked up as is sometimes supposed. The more trustworthy though more expensive method may be to select a completely formed component and test it as nearly as possible as it would be tested in actual work.

p. 165.

Where the volume and character of purchases justify it, the practice of having an inspector or viewer working in the general stores may prove more expeditious than referring the items concerned to the view room or inspection department proper, but with a competent receiving clerk qualified to deal with many of the supplies, the latter course is likely to be the more economical.

Whatever the arrangements for inspection it is very desirable that every receipt of goods be inspected by somebody of competence, though not necessarily by any one official, as his qualifications can rarely range over the whole ground. Fuel, for instance, will require a very different experience to that necessary for bolts and nuts, and timber different again from both.

The form of the report or certificate of goods received is important only so far as it allows the requisite elasticity in the inspection routine and meets the convenience of the office routine for passing of invoices. **Material Receipt.**

These requirements favour the use of a separate sheet or card for each receipt. These goods received notes should be numbered serially using a prefix such as "G. R." to distinguish the series from invoice and other commercial references. **F 82.**

Each note should be certified by the receiving clerk as to quantities, weights and descriptions, and then passed as to inspection by a suitable authority. A carbon copy of each note should be retained at the general stores.

The receiving clerk will mark off each receipt on the stores copy of the purchase order concerned—these copies being held under the suppliers' names rather than under the purchase order nos., in case the latter are not quoted on the supplier's advice note or marked on the package containing the goods. **F 81.**

Insistence on the suppliers sending advice notes for each consignment, apart from the invoice, is very important for following up delays in transit promptly and in proving differences.

The issue of these advice notes to the receiving clerk should be at the discretion of the storekeeper, but under a proper administration there is not much likelihood of the receiving clerk neglecting his duty of checking by merely copying out the supplier's advice notes.

It is desirable on general grounds that suppliers' invoices should not be sent beyond the works accounts office, however trustworthy the stores staff may be. The absence of invoices beneficially influences the care and promptitude with which the goods received notes are prepared. Without exception, materials received each day should be recorded and the goods received note issued accordingly to the department urgently concerned, viz. the production office.

Adherence to this principle of not issuing the invoices to the general stores will involve the establishment of a routine by which they are advised as to returnable packages. **Returnable Packages.**
p. 469.
p. 494.

There is an increasing tendency to include packages in the price of goods and for the packages accordingly to be non-returnable. Although the practice of the various suppliers in this matter may be known to the stores staff, there is some danger of confusion, and also of neglect in returning those packages which are returnable, if the general stores are not instructed. It is a very simple matter for the works accounts office to make out a returnable package

**Returnable
Packages.**

card for each package invoiced, and to send these cards to the general stores.

F 84.

A difficulty that may arise is in identifying the packages when they come to be returned.

Sometimes the course is adopted of giving a serial number to every package received, but this involves a certain amount of extra work and cross reference, and under most circumstances it will be quite satisfactory and easier to mark each package with the G. R. (Goods Received Note) number.

F 82.

A suitable routine can be arranged on the following lines :

When the completed goods received note is sent to the works accounts office, *presumably never later than the day following receipt of the goods*, it will be marked off against their copy of the purchase order, and then sorted alphabetically in a suitable sorting device. As the invoices come to hand the goods received reports will be matched up with them and where called for, returnable package cards will be made out. These package cards will bear on them the G. R. number, the supplier's invoice date and reference, and the value of the package.

When the package is returned to the supplier the advice of return will quote the supplier's invoice date and reference and the value of the package. By a suitable note on the advice of return or on a carbon copy of the railway consignment note, thus saving work, the supplier will understand that he has been debited with the value of the package. The works accounts office will receive a copy of this advice of return, with the respective returnable package card attached and the general office will be advised as to debiting the supplier by the works accounts office passing on the advice of return.

F 113.

p. 326.

The advantage of this arrangement is that only such packages will be returned for which credit can be obtained, and also that it will be made very easy for the general stores to ensure returning every such package without further reminder. A further point is that if a supplier's package is used for the despatch of goods, it is only necessary for the returnable package card to be marked accordingly and returned to the works accounts office, for all accounts to be kept clear. Beyond that again the value to be allowed for the package may, in view of the return carriage having to be paid, make it sometimes inadvisable to return the package. To ensure the exercise of this discretion the returnable package card can be designed to call for the amount of carriage payable to be noted.

The routine may be helped by returning packages on a fixed day each week.

There is in every business a certain number of receipts of goods for which either a purchase order has not been issued, or cannot be readily traced. Most of such receipts will refer to goods sent in for repair or replacement, and it is this latter class that requires special attention. Frequently customers return goods without adequate advice, and in other cases there may have to be investigation and negotiation before a credit can be passed.

Non-Purchase
Receipts.

By instituting an acknowledgment of goods received form for these cases, it becomes possible to register the receipt right away without commitment as to acceptance of the goods or hasty settlement of credit to be passed. This acknowledgment may be in triplicate, the top copy being sent away, the second copy passed to the works account office, and the third retained at the general stores, with adequate room for asking the reason of the delivery.

F 83.
F 119.

Even when instructions for repair or replacement are quite clear, the acknowledgment of receipt is desirable for internal purposes and also as a matter of courteous treatment of the customer.

In the case of a motor car, for instance, sent in for repair, details of the owner's loose kit can be set out on the acknowledgment of goods received and so obviate dispute when the kit is delivered back again.

It might even be a condition of returning the goods that this acknowledgment form be given up, or its absence satisfactorily explained, particularly where the class of articles repaired lend themselves to confusion as to identity or misrepresentation as to ownership.

Where an acknowledgment is issued for goods that are ultimately purchased, as distinct from being credited, a goods received note should be issued, when purchase is decided on, to cover same, giving a cross reference to the acknowledgment of goods received form.

Arising from the purchase of goods will be the question of goods rejected and other claims. These will be met as to obtaining the necessary credit by an entry by the receiving clerk on the goods received note in conjunction with an advice of return covering the return of the goods, when such is necessary.

Rejections
and Replace-
ments

p. 460.

F 82.
F 113.

The works accounts office from these several sources make up credit claim notes, generally known as debit notes, for the amounts involved. Invoice differences as to quantities, prices or calculations will be handled by the same routine.

The reason for adopting the term credit claim note in preference to debit note is that a credit note is desired as confirming the matter. There is a suggestion of arbitrariness in a

F 165.

**Rejections
and Replace-
ments**
p. 279.

debit note especially if a compromise has afterwards to be conceded. The credit claim note is just as effective as an accountancy instrument.

The ordering of the replacements of rejected materials is best dealt with as a new proposition under a new purchase order reference. As a corollary of this all rejections should be charged back to the suppliers through the medium of credit claim notes, and invoices accepted for the replace material. The copies of these replacement orders should be attached to the copy of the original order so that there shall be no oversight in following up deliveries.

F 54 The routine for issuing replacement requisitions should centre where the purchase requisitions do, and for materials of production, this, it is held, should be the works office. In a few cases this may be a roundabout way, but for the main part it is the only safe routine and co-ordinates replacement necessities, discovered at the time of receipt, with those arising in the course of production.

Frequently, of course, replacements will result from causes not attributable to the supplier of the material, in which no question of a credit claim will arise.

F 56 A matter of considerable importance in maintaining the flow of output lies in having reserve stocks of material to meet replacement requirements. These reserve stocks need to be under the control of the works office, and, for that reason, only this office can exercise the necessary discretion as to the issue of replacement orders.

**Identification
of Goods.**
p. 288. F 82.

The identification of goods while in the stores is important, and the goods received note (G. R.) number is the most serviceable reference.

This method of identification is particularly appropriate in the case of special purchases, *i.e.* goods bought for particular orders.

F 85 In these cases a stores tally may be attached to each consignment, and the issues marked off until the consignment is exhausted.

F 86 Further by quoting the G. R. No. on the goods issue voucher the origin of any faulty material may be traced with more ease.

The application of this scheme of purchase identification to standard fittings involves the use of separate bins, or preferably separate trays or boxes for each consignment, and this has been carried out with success.

Stock Control
p. 145.
p. 371.

The subject of stock control is so intimately linked up with production regulation and stock accounts that the discussion here can only be partial.

Certain aspects of stock control are touched on also under the **Stock Control** headings of "Warehouse Organisation," "Intermediate Process Accounts" and "Stocktaking,"

p. 315
p. 386.
p. 499.

Stock control comprises three elements :

1. *Safe and orderly custody of the stock.*
2. *Administration of stock in the sense of settling the kinds of stock to be held and regulating the disposal of same.*
3. *Maintenance of adequate stock.*

Very commonly storekeeping, as the care of stock is usually called, does not seriously attempt to control the selection and disposal of the stock, beyond requiring written demands from foremen before issuing goods from stock, or before taking steps to add new lines of stock.

Under these conditions there is likely to be a needless range of stock kept and an accumulation of surplus stock.

Surplus stock may arise from injudicious purchases in regard to quantities, but more frequently by an altered demand consequent on changes in design.

This latter reason is so prolific in causing surplus stocks that the practice of ordering practically all material only as and when required to meet specific orders has a great deal to recommend it, particularly when associated with the holding of reserve stocks.

There is, however, scope for standardisation in regard to goods necessarily held in regular stock. The following are typical items calling for this treatment :

BAR—Steel and Brass—Rounds, Hexagon, Squares and Flats.
SCREWS—" " —Round Head and Countersunk Head.
STUDS—Steel.
BOLTS—Steel—Hexagon Head.
PINS—Steel—Taper and Split.
WASHERS—Steel, Iron and Brass.
NUTS—Iron and Brass—Hexagon.
WOOD SCREWS—Iron and Brass—Round head and Countersunk Head.
FILES—Iron and Brass—Hand, Flat, Half Round, Warding Square, Three Square and Round.
HAMMERS—Iron and Brass—Engineers' Hand, Riveting, Lead.
HAMMER HANDLES.
MALLET—Hide and Boxwood.

Lists detailing the standard sizes may conveniently be issued as blue prints, mounted on boards, to all departments. In the case of bar stock, the colours painted on the ends of bars to distinguish the several kinds of steel may be included in such a list by description.

It is recommended that this standardisation be carried out to its logical conclusion in the form of a stores catalogue, each size and variety selected as standard being detailed therein and given a reference number on the lines of the classification scheme illustrated on page 290 *et seq.*

Stock Control.
p. 391.

The selecting of standard sizes and varieties will render "non-standard" the stocks held of other sizes and varieties, and this selection may be expected to furnish astonishing figures as to the amount of really surplus stock commonly held and considered as good stock.

Proceeding to the routine incidental to the maintenance of
F 89. stocks, it will be much more convenient to establish an ordering level in each case rather than to fix the maximum and minimum quantities to be kept in stock.

Not only should the ordering level be fixed but also the normal quantity to be ordered, and both must have regard to the time required for obtaining fresh supplies and the liability of the stock becoming exhausted meantime. This arrangement effects all that is intended by the idea of maximum and minimum levels, and is a more readily applied formula.

p. 154.

As pointed out elsewhere, the control of reserve stock, which it may be assumed will only occur with materials entering directly into the works products, falls peculiarly within the province of the works
F 55. office, and they may have to authorise each issue by means of a stock
F 56. appropriation ticket. In this event the necessary stock control is centred in that office—a reserve stock control card being kept for each item of all receipts and all issues authorised. The safety of this course hinges on a proper system of stock scrutiny. The routine of stock scrutiny is discussed at some length in connection with stock accounts, and it is sufficient here to explain that by scrutiny is meant the checking by an independent party of the stock, to verify that the stock accounts are in order as to the book or account values of stock on hand, and, further, to verify the accuracy of the control cards, on which quantities only are entered.

If, therefore, the control cards for reserve stock as kept by the works office are brought into frequent review by the process of stock scrutiny—carried out presumably by the works accounts office—there ought to be no fear of reserve stocks becoming exhausted without the cognisance of the former office. Theoretically, if reserve stock is only issued on specific authority from the works office, there should always be agreement between the actual stock in the stores and the stock balance indicated on the reserve stock control cards. It is, however, rarely wise to trust implicitly to any theory where a slip or oversight may be serious in its effect. Apart from the possibilities of stock scrutiny, it may be
F 85. feasible to have the ordering levels, previously mentioned, marked on the stores tallies attached to the bins holding the items of reserve stock, so that the storekeeper may be in a position to remind the works office in good time.

Stock control cards of one form or other constitute the means **Stock Control** for effective administrative control so far as selection and disposal of stock are concerned. They are records that must be at the command of the parties responsible for this control. Their use and development are something apart from the works accounts, and it is very desirable that the stock records, as used for control purposes, shall be largely independent of the stock accounts, as used for works accounting purposes. It is both possible and desirable that both sets of statistics should be subject to the same classification with sub-classification developed as experience may dictate.

Turning to stock items that are not likely to be controlled by the works office and have consequently to be controlled by the general stores itself, the application of stock control cards will be restricted to that of stock checking.

The stock control cards as kept in the general stores will be essentially for the use of the storekeeper, though also available for the purposes of stock scrutiny. It will be desirable for the storekeeper to always verify the stock on hand before submitting a purchase requisition for further supplies. This is obviously a F 54. convenient period with the stock at a low ebb, and enforces a check of every item of current stock in the course of probably three months.

A development of stores organisation having a considerable influence on the stock control routine, is that of dividing the general stores into two sections of "wholesale" and "retail." **"Wholesale" and "Retail" Stock.** p. 390.

The division cannot be carried out throughout the whole range of stock, and has most practical advantage in its application to such goods as are in unit form, and are served out in relatively small quantities. Bolts and fastenings will furnish the bulk of such items. p. 293.

If the wholesale stock of bolts, etc., is kept in small even parcels suitable for transferring to the "retail" section—whether within the general stores or at a sub-stores—the stock control can be concentrated on the "wholesale" stock and the loose stock held for retailing may be ignored in maintaining the stock.

The successful application of the idea means standardising the running lines, so as to minimise the number of items to be held in the "retail" section. p. 299.

This is quite an important point under any circumstances, F 139. as there is frequently an unnecessary variety of sizes held in stock. Wood screws and files are typical items in which this occurs.

"Wholesale"
and "Retail"
Stock.

Only the standard running lines would be held in both the "retail" and "wholesale" sections. In the case of non-standard or special lines, the whole of the stock would be held in the "wholesale" section, and obtained as required for issuing.

This being the case, there should be no risk of bad stock actually resulting from there being several retail sections, or sub-stores, nor should any question arise of an excessive margin of stock being necessary to keep the sub-stores going.

This scheme of a "wholesale" section is particularly convenient when the general stores is on two floors, and it is desired to have all the serving done on the ground floor.

Sub-Stores.

p. 375.

For the better working of certain departments it will usually be found desirable to establish subsidiary stores, conveniently termed sub-stores.

There may be also sub-stores dealing with oils and greases, or other special groups of general stock items, and possibly as "retail" sections on the lines mentioned above.

F 89 It will be necessary to have separate stock control records for each sub-store, if only in the interests of the head storekeeper to ease his responsibilities and to locate the stock for checking purposes.

Not infrequently it is thought expedient, on grounds of economy, to have a departmental store looked after by the shop foreman, without any regular attendant, though the practice is essentially a compromise as storekeeping in principle should be kept quite clear of foremanship. In such cases the foreman is responsible for furnishing the necessary records of the issue of the stock in his charge.

If the foreman can be depended on to always book out the goods as and when he issues them, there should be very little inaccuracy—providing always that the goods are not liable to be taken by his men without his full knowledge.

F 76. Sometimes the foreman furnishes a weekly report of his issues, but this almost encourages procrastination.

F 86. The safer way, and for accounting purposes the prompter way, is for the foreman to make out a goods issue voucher each time he draws on his stock, and for these vouchers to be collected from him daily.

p. 47.

The works post system referred to elsewhere will allow the collection to be made whenever the foreman elects to put the vouchers in the post bag.

The transfers as between the general stores and the sub-stores

that are directly under the head storekeeper need not necessarily be reported to the works accounts office as single accounts for the entire stock may be kept by them. Sub-Stores.

In the case of sub-stores not in this category, as when under a departmental foreman, the transfers will have to be reported. A goods issue voucher will serve if suitably endorsed by rubber stamp : " Transfer from General Stores to Department..... Stores. Issue to shops to be reported to Works Accounts Office."

Some of the problems arising in the case of foundry and smithy sub-stores are considered under the heading of intermediate process accounts. p. 499.

Auxiliary supplies of general use constitute a fairly extensive portion of the stock in most general stores, and by their nature involve a good deal of traffic between the shops and the stores. p. 288.

To minimise this traffic, the course is recommended of localising the distribution centres of many auxiliary supplies within the shops, if possible. The use of the tool stores is suggested as being usually the most efficient arrangement, if the tool stores is properly located. p. 144.

The responsibility can, with advantage, be placed on the tool store chargehand for exercising a restraining influence on the consumption of supplies by the men.

Whether the tool stores shall, in consequence, be considered as constituting, in part, a sub-store under the general stores, must depend mainly on whether it serves more than one department. If it serves only one department, the supplies as transferred to the departmental tool stores can be charged at once to the department in question, more particularly if only relatively small quantities or, say, weekly rations are transferred at a time from the general stores. Such a proceeding cuts out a lot of detail work from the stock control records, stock accounts and cost allocation accounts.

Even when a tool store serves more than one department, an apportionment of each class of supplies, based on a weekly estimate from the tool store chargehand, would probably be accurate enough to justify direct charging to the respective departmental accounts.

The essential point to be gained by giving way, if need be, on some fractional accuracy in apportionment of cost, is the saving of written demands from the foreman.

If the stock accounting requirements are made sufficiently elastic to obviate any necessity for foreman's signatures, the tool store chargehand can be made to serve a very useful function and achieve surprising economies. His ability to stimulate economy lies in

Sub-Stores. his practical experience of the shop conditions coupled with some simple means of tracing the supplies drawn by each man over any period.

The simple means in question may be established by having each workman give a paper ticket for what he requires. This brings home his individual responsibility in the matter and provides a means whereby he need not wait for his foreman, and, further, that allows him to send a labourer or messenger for what he needs.

Fig. A ticket similar to that used for borrowing tools will serve for this purpose, and the tool store chargehand can file the tickets used for supplies in a rough card cabinet behind cards bearing the men's numbers.

F 68. An alternative and better method to that of preserving the tickets is to enter the issues on sheets ruled into a hundred squares, on cross index sheets as referred to in connection with casting instructions. In the respective squares, which will represent check numbers, a mark, either dot or stroke, is made for each issue—there being different sets of sheets for different supplies. This is virtually a graphic method, the superabundance of marks in any square being very evident to the eye.

The graphic evidence is clearer and economy the more likely if trouble is taken to serve out supplies in a regular way. Thus red lead or emery powder can be served in small tins, each tin containing just enough for a serviceable mixture to be made, and incidentally the worker will appreciate the convenience. Emery cloth, to take another example, may be served out possibly in single half sheets. These economies may seem over-strained, but what might be called "decimal point" economies have a way of counting up in the course of time—just as for the same reason "decimal point" excesses cannot be safely ignored.

The possible economy in distributing files from the tool stores will be recognised by those who have tried utilising the general stores to keep down this expense. Rules limiting each fitter to a certain number of files per week defeat themselves, and files are deliberately put out of action to ensure an opportunity of demanding the full quota of new files each week. There is no economy in arbitrary restrictions as to file consumption, but there is need for supervision.

By the semi-graphic squared sheet method, the tool store chargehand can exercise quite sufficient supervision by noting the class of work done by each man. The comparison of one man's consumption with another's will help to indicate fair allowances in each case.

All such records will be worth keeping and may occasionally be

looked through by the works manager, and quite frequently by the **Sub-Stores** stock checker or scrutineer.

Fresh sets of sheets should be made up for each fortnight, and there is nothing to prevent these records being utilised for cost allocation purposes if it is felt that direct charging to departments as the supplies are transferred from the general stores is undesirable.

Some modification of procedure will be necessary if any auxiliary supplies, such as files, are charged to sales or production orders instead of expense accounts. Such a course is not unusual in repair work, as the basis of invoicing may make it necessary to do so. In these circumstances, the tickets filled out by the men, or it may be by their chargehands, could, by stating the order number, be made to serve as goods issue vouchers in the works accounts office—the charge for supplies against the department being proportionately reduced.

The foregoing remarks, at best, can only apply to a limited proportion of auxiliary supplies and local convenience must settle how far the scheme can be carried.

Fuel, particularly for power purposes, is a very important item **Fuel** of auxiliary supplies, and its consumption can hardly be regulated through any ordinary stores channel.

p. 376.
p. 543.

There will be little doubt as to the necessity of a periodical report, for administrative purposes, by the plant engineer, stating the output of power, cost of labour and consumption of supplies. The simplest course is to make the plant engineer, or person acting in that capacity, responsible for correctly allocating the consumption of fuel each week, and responsible too for any shortages in the fuel stock. It may be wise to have the plant engineer make the report direct to the works accounts office rather than through the general stores.

There are items in the category of plant supplies, which are **Plant** also not quite easy to control from the general stores. **Supplies.**

A case in point is building materials, when used on small repair jobs. The larger jobs can be dealt with better, as special purchases will usually be made which can be charged direct.

There is the question, too, of discarded plant and building material that is not sold but held in stock for consumption on repairs and alterations. This matter is also discussed in connection with the valuation of buildings and fixed plant.

p. 477.

Stock material, whether new or old, passed into the charge of the building or millwrights departments can only be allocated

**Plant
Supplies.**

through the medium of a report by the respective foremen in lieu of an organised departmental store, which is unlikely to be necessary in any ordinary works. The less goods that have to be held in the departmental stores the less scope for inaccurate allocation.

**Electrical
Supplies.**

In the case of supplies for electrical repairs, the new materials required should be issued, as far as practicable, in detail for each job from the general stores, and comparatively little stock held by the electrician.

One item requiring special treatment is the stock control of incandescent lamps. While the general stores should hold the "wholesale stock," the retailing should be a personal responsibility of the electrician, who must keep statistics of the actual distribution of the lamps if proper economy is to be effected.

It may be worth while to number each lighting point for record purposes, as street lamps are numbered, and to indicate them on a works plan.

The mere exchanging of new lamps for old ones may control the number of lamps in the shops, but in no sense does it ensure the proper use of lamps. The pilfering of lamps is a serious cost in some factories, and means should be adopted of marking the firm's name on each lamp to reduce the temptation.

The electrician must needs exercise judgment and be supported in reasonable efforts towards economy.

The new lamps when only issued to the electrician in small lots can be allocated at once to the lighting expenses account.

**Implements
and Utensils.**

There are a certain number of appliances used in a works that are tools in one sense, but which it is rather unusual and inconvenient to bring under the direct control of the tool stores.

Except on the ground of convenience, it might be argued at once that the general stores should only hold the "wholesale" stock in such cases.

p. 292.

The typical items in this category have been listed in the general stock classification under implements and utensils—a heading chosen to avoid implying tools in the usually accepted shop sense, although some are obviously of that character.

The general stores may serve out to some departments, not handy to the tool stores, implements and utensils on loan, and it is sound economy to treat all issues of these things to the workmen as loans, despite the fact that they may be rapidly consumed and require early replacement. The routine suggested for the ordinary

∴ F 92. tools issued from the tool stores on permanent loan, whereby the

man has a tool card on which the loans are entered and against which items the replenishments are noted, can quite easily embrace the general stores for specified articles. Implements
and Utensils.

A shop labourer might even have a tool card on which his broom and brushes are entered. The practice stimulates economy and involves no additional clerical work, possibly less, than the usual authorisation by the foreman.

Utensils and implements issued from the general stores to the tool stores should, if possible, be allocated at once to the departmental expense account concerned.

Timber stock has its own peculiar problems. When the stock is considerable a special attendant is necessary, and the technical knowledge requisite for properly handling timber, may place the timber stock outside the head storekeeper's control. The supervision may, in that case, be vested in the woodworking department foreman, though the better compromise is probably to have an attendant with sufficient timber knowledge to be responsible, in the first instance, to the head storekeeper, but subject, on technical matters, to instruction from the foreman or other qualified person. Timber.
p. 376.

Not infrequently the responsibility for requisitioning timber rests with a higher official than a foreman, and this official would then control the timber stores attendant.

The principal difficulty with timber stock arises from what is called conversion, that is, converting timber from one shape to another. For instance, timber may be brought in the log and cut into deals or planks, and these again, perhaps, into boards. Each conversion means labour cost and waste of material in the form of sawdust.

The labour cost of conversion may be supplemented by the cost of drying in special ovens apart from the cost of handling in the process of seasoning and storage rental.

Another problem is the surplus material left from planks or boards, when cut up in the making of product or patterns. This surplus may only be useful as firewood in part, but it is far from all being scrap.

Some factories make file handles and other handles out of certain of its waste timber. This means the installation of suitable machinery that only a large works can operate economically. In smaller works such timber might be sold, if only for toy-making, rather than burnt, though wood waste as boiler fuel can be made quite a satisfactory proposition.

Assuming a proper economy is exercised in regard to the timber generally, there is always the problem of allocating the timber used

Timber. to the proper orders. A fine degree of accuracy is not likely to result from any method nor perhaps is it necessary.

On large contracts the percentage of error in allocating on the assumption that all the timber drawn, or even ordered, for the work is used, may be negligible. On smaller jobs the error may be more marked, but even then the money value of the error may not justify many refinements in the accounting, so long as there is no actual waste of material and the only error is one of bookkeeping and of small moment.

A satisfactory compromise is for each joiner and pattern-maker F 88, to make out a timber ticket for each job, stating the thickness, width and feet run of timber used and wasted—assuming the small scrap timber to be waste, which it may not be.

These tickets are passed to the timber store attendant, who extends each item into superficial feet (12" by 1" section), or cubic units (1" by 1" section by 12" long). He can then note the quantities on stock control cards arranged with five columns :

- | | |
|-----------|---|
| Column 1— | Quantity received from outside or from conversion. |
| " 2— | Quantity sent into shop for use or conversion. |
| " 3— | Quantity left in timber stores. |
| " 4— | Quantity accounted for by shops or returned to timber stores. |
| " 5— | Quantity in shop unaccounted for. |

This scheme makes it easy to adjust the stock control records as necessitated by conversion—the receipt of the converted timber being entered in column No. 1 of the stock control card used for the new size or scantlings, and not on the original card.

All timber as received should be marked with the G. R. (goods F 82, received note) number and the date.

Converted timber should be marked with the conversion order number and date, the origin of the timber being indicated on the conversion order.

Specific job orders for each conversion are advocated to regularise the work and to avoid the use of standing orders in the shop. These orders might be made out by the timber stores attendant.

Apart from booking out all timber issued, the attendant needs to record the moving of timber in the stacks, and to keep a current plan of the timber stacks.

**Component
stock.**
p. 155.

The lines to be followed in the stores organisation with regard to component stock must be largely influenced by the existence or otherwise of a work-in-progress or work depot, and the constitution of the work depot will, in turn, reflect or hinge upon the policy and methods adopted in the manufacturing of stock product.

If the practice is adopted of putting through stock production orders for complete products, as distinct from individual components,

the function of the work depot will be extensive. This depot will then collect and hold the components as they are finished for each order, in readiness for assembling, and be responsible for delivering the complete product to the warehouse or finished work store. .

Component
Stock.

F 108.

When all components are individually put into stock as made, and issued from stock for assembling purposes, the functions of the work depot will stop short of holding finished components, and a proportionately larger field will have to be covered by the general stores organisation proper which will then need to include a finished component store.

F 89.

In the normal course it may be assumed that rough components (castings, forgings and stampings) made for specific stock production orders will not go into stock literally, but will be allocated as received into the general stores to the respective orders.

When the cost of rough components has been allocated at this stage, the components may be transferred in bulk to the work depot or issued direct to the shops from the general stores, though the former course is to be preferred.

F 129.

Reserve stock of this character will be however retained in the general stores, and the initial charge debited to stock accordingly.

F 56.

When the practice obtains of making the individual components for stock, the transaction of withdrawing them from stock for assembling purposes is apt to be tedious in the amount of detail required.

The best course will usually be to use either an assembly list or a quantity slip with a covering goods issue voucher for each issue

F 48.

F 53.

F 86.

Even when a number of the items in any list have to be struck out as not issued at the time, the list is still advantageously used by facilitating the entries and records for stock control and cost allocation purposes.

In the case of spare parts, or finished components, held in stock in readiness to meet customer's requirements, consideration may be necessary as to the advisability of holding the requisite reserve stock mainly as rough components, as previously discussed.

p. 10.
p. 154.
p. 520.

In some industries, as for example, motor car manufacture, the spare part proposition may be large enough to justify its own special stores.

In any case, it may be taken as of prime importance in the regulation of the works production that spare parts should not be held in the same store with the finished components intended for assembling.

Generally speaking, the warehouse will be the most suitable centre for holding the stock of spare parts. The responsibility

F 110.

Component Stock.

of the warehouseman for despatching orders should ensure the personal knowledge necessary for maintaining the stock of spare parts at the approved level.

When the pressure of sales fluctuates, it may be policy to take advantage of any opportunity that arises of getting the reserve stock of rough components converted into spare parts.

The problem of economically and promptly manufacturing spare parts is often of a harassing character, and is only to be solved by unceasing watchfulness.

- The decisions as to the proper level of stock to be maintained must be based to a large extent on experience with each design of product. The records of spare parts used to meet sales repairs and sundries orders must be carefully kept in some card index or loose leaf form, with a separate card or sheet for each spare part, so as to automatically accumulate the data necessary to settle these stock questions. Such statistics will require to be used with discrimination, as weakness in design of particular parts will create excessive but temporary demands until remedied. The matter is one essentially of conference of suitable representatives from the drawing office and the repairs department with the works manager.
- F 57 All stock authorisations of this character require to be periodically revised.

Issue of Stock

- Some further reference is necessary to the routine for obtaining goods from stock. As to reserve stock, it has been recommended that the works office should furnish the necessary authority, which involves sending a stock appropriation ticket to the general stores and a goods issue voucher to the party interested in withdrawing the goods. The term voucher is applied to emphasise the functions of the form and to enhance its importance in the relations of the stores to the shops.

- In the matter of special purchases, which may, if the policy of reserve stock is adopted, cover the bulk of the material used in production, some arrangement is necessary whereby the departmental foreman concerned is advised as to the arrival of the material. It may be desirable, and under any thorough organisation, it will be necessary, to regulate the issue of these materials in accordance with the production schedule obtaining at the moment. Very frequently entire discretion is left to the foreman as to withdrawing material from the stores. From the stores point of view the sooner special materials are issued to the shops the simpler their work, but want of reasonable discrimination in this direction is likely to cause a great deal of trouble.

Quite often the stores accommodation is on too niggardly a scale

for the stores to carry out their proper function of storing goods *Issue of Stock.* until wanted. Under such conditions the shops are forced to take materials before they are ready for same, to the detriment of the work in progress. The principle of keeping the shops floors clear of materials not in process of being worked can only be adopted in conjunction with a suitable stores system with suitable accommodation.

The better compromise is to have a work depot, so called here to avoid confusion with the general stores, where material not in progress can be held and from which the production can be largely regulated, on the lines discussed under production regulation.

p. 151.

The work depot should be suitably screened off from the open shop and secured against unauthorised entrance. When bulky or heavy components are concerned involving overhead crane service one part of the work depot can be just railed in, or merely a broad white band painted on the floor can be made to serve.

This work depot can take over materials as received at the general stores, more particularly castings and forgings, and issue them in batches according to production requirements.

Under these conditions, the work depot would require the notification of arrival of material and the foremen would get their work from the work depot.

Whether the work depot or the shop foremen deal direct with the general stores as to withdrawal of goods received from outside, it will be found a most convenient practice for the general stores to prepare a goods issue voucher for each receipt of material purchased for a specific order as distinct from reserve stock controlled from the works office. This voucher will be blank as to a receiving signature until presented through the proper channel in exchange for the material. The vouchers may possibly be passed first to the works office, if such exists, for their information and possible regulation as to the time or rate of issue of the material to the shops, and thence passed to the work depot, or direct to the shop foremen to obtain the goods in question.

p. 153.

Whatever exact procedure may be adopted one guiding principle should be to control the quantity of material to be issued for a given job—otherwise the shops will draw in excess to cover possible wastage—the more likely so if careful investigation of rejected work is attempted.

p. 154.

Turning to ordinary or general stock, the general stores can hardly prepare goods issue vouchers in advance, and these must, therefore, be made out in other quarters. In the matter of auxiliary supplies and tool stores replenishments, the vouchers may be written out and signed by the tool store chargehand, while for production

F 86
F 56.

F 53.

Issue of Stock. material, the work depot may make out the vouchers or the shop foremen, as the system adopted may provide. Whatever general scheme is adopted in this matter some compromise to suit various conditions is likely to be necessary.

The use of quantity slips for controlling the issue of materials is capable of application not only to regular production, but also to customer's repairs and even to works repairs.

p. 11 F 51. In the matter of customer's repairs, where an estimate has been made, this control of the new material to be used is often very important. In such cases the storekeeper would mark off all items as issued, and refuse further issues except the quantity slip be amended by the proper authority.

p. 413. The economy exercised in connection with works repairs by this method can be very marked.

It is probably rather sounder in practice to prepare first the requisite goods issue vouchers from the quantity slips than to expect the general stores to test the validity of each voucher against this list before issuing the goods.

p. 298. A point not always properly appreciated by storekeepers is the importance of identifying all issues of stock in such a way as to ensure a correct understanding in the works accounts office as to what has been issued. So far as the goods received note no. can be quoted the identification is complete, but for stock generally, a classification reference is the more satisfactory alternative.

p. 288. This matter is considered at more length under the heading of Stock Classification.

Returns from Shops. A certain amount of material is likely to be overdrawn by the shops though under a proper system of stock control this will be reduced to small proportions.

p. 378. Taking the everyday case of steel bar drawn for machining in longer lengths than will actually be used; the excess length may be intentional for chucking purposes in the machine, or may be accidental as being the nearest length available in the stores.

If bars can be cut off to length within the stores the excess quantities issued will be more moderate than when cutting off has to be done in the machine shop. On the other hand, there is no certain economy in having the excess length very small lest there be no more than scrap value in it when returned to the stores.

Under a production control system whereby the approximate net quantity of material actually required is specified on a quantity slip, the excess is, within small limits, a known quantity and can be dealt with as on loan to the shops.

The shop loan arrangements should ensure the excess material being returned accompanied by a shop credit slip. From this slip the stock control record, stock ledger, and cost allocation account will be adjusted by a proportionate reduction.

Returns from
Shops.
F 87.
F 89.
F 123.
F 130.

The shop credit slip can very well be made out, except as to net quantities, by the stores and given out with the material in the first instance. This will simplify the routine and if a carbon copy is retained, it will be a simple matter to see that all the slips are returned, and therefore that all shop loans are accounted for.

The necessity of returning excess material to stores is very marked where fine distinctions in metals exist, such as with steel bar, lest the surplus be applied to quite a wrong and it might be, dangerous use.

There will be other returns from the shops which cannot be foreseen definitely, mainly swarf, that is metal cuttings, and defective material.

Defective material should preferably be returned to the general stores through the medium of the work depot.

Swarf of non-ferrous alloys, such as gun-metal, in view of the values involved need to be the subject of shop credit slips, particularly to get as much as possible credited to the original orders in connection with which the swarf has been produced.

Some responsibility in the matter can probably be attached to the shop labourer, whose interest in the collection of non-ferrous swarf in a clean, unmixed condition can be stimulated by a bonus on weight delivered to stores. Surprisingly improved prices have been obtained for swarf as the outcome of a small bonus of this sort, say, one shilling and sixpence per hundredweight. Carefulness in collecting all the swarf is also induced. Due regard must be paid to the possibility of deception such as adding water to increase the weight.

The precaution of running non-ferrous swarf through a magnetizing machine to eliminate iron and steel is useful, but care in not allowing this admixture to occur is the more important.

The shop labourer will usually be able to write in the few particulars requisite on the shop credit slip, and obtain a confirming initialling from either the mechanics, from whose machine the swarf is being collected, or from the chargehand.

Certain classes of scrap, particularly iron and steel, accumulate under conditions that only allow the quantities to be taken when the scrap is disposed of, and consequently it is only then that the necessary shop credit slip can be made out.

Stationery is not usually considered as pertaining to materials, or even to storekeeping. A marked economy can, however, often be

Stationery.

Stationery. effected by proper control of this class of stock, including therein
p. 62. office supplies and drawing materials.

It is not suggested that a value be placed on this stock though that would be admissible for ordinary commercial articles not bearing the company's name, such as pencils, drawing paper, memorandum books and the like. Typical items of this sort are included in the general stock classification.

p. 293.

The control of the stock of printed forms incidental to modern routine methods is important, not merely on the score of economy but as bearing on the successful running of the routine organisation. Provision for stock control and standardisation of forms should precede the institution of modern methods lest the new systems lose prestige through form supplies running out or proving needlessly costly through injudicious purchasing.

The principles of stock control should, therefore, be applied to stationery whether the stationery stores be within the general stores or not. The scheme of wholesale stock will make the plan more workable. Issues to departments may be according to fortnightly applications from departmental heads, and the management should encourage carefulness in this direction without instituting unreasonable restrictions.

IV D

WAREHOUSE ORGANISATION

THE primary function of the warehouse may be described as the housing of wares ready for sale in contradistinction to (1) the general stores, including in that term the finished component stores, which exists essentially to serve the interests of production, and (2) the work depot which is in the nature of an exchange station or clearing house for the work in course of manufacture. The inspector may be in general charge.

Warehouse
Functions

Frontis-piece

p. 165.

The character of warehouse stock is essentially stock ready for sale, except may be as to some minor modifications to suit different customers—modifications that, for the most part, should seldom necessitate the goods being sent into the works for alterations.

In certain businesses, typically of course that of the motor car, spare parts are likely to be an important line of saleable stock, but whether of large extent or not, the stock of spare parts is really warehouse stock, and certainly should be kept distinct from assembling stock. The fact that the main provision for supplying spare parts may be made by holding reserve stock of rough components only—to be finished as required—does not detract from the principle of holding all finished spare parts in the warehouse, while holding the reserve stock of rough parts in the general stores.

The major portion of warehouse stock may be assumed to be complete products. These complete products may be further assumed as all coming from the works, although, when other makers' goods are factored, no essential difference arises beyond that the purchased goods in question may be received direct into the warehouse from the supplier, instead of through the general stores or view room or other works departments.

Here again the nature of the goods and the nature of the inspection required before acceptance would regulate the routine as to receipt.

The maintenance of warehouse stock needs to be based on estimated sales requirements, and these estimates again will be largely influenced by previous sales statistics.

**Warehouse
Functions**

Warehouse stock control records should, therefore, embody statistics of sales to date, a consideration for which there is no parallel in the case of general stock.

p. 318. Another aspect peculiar to warehouse stock is that of sales appropriation. The appropriation of stock in hand should be, in one way, little less than despatching, unless despatch waits on other matters, when labelling conspicuously may be sufficient appropriation pending despatch. Appropriation of this sort does not secure any stock control, nor does it meet in any way the case of stock appropriated before delivery to the warehouse.

p. 520. The principle may be laid down with safety that all production of warehouse stock must be sanctioned by the managing director. He may, with advantage, base his decisions largely on the recommendations of a committee consisting of the principal officials interested, supported by the data of previous sales.

p. 23. F 12 These sanctions will be embodied in stock production orders, F 49 and it is this order reference under which the works must make deliveries of the finished articles to the warehouse.

This reference should be, if possible, stamped or painted on every such article, and, in addition, each one should be plainly labelled with the same and the date received at the warehouse.

**Identification
of Works
Product.**
p. 12.
p. 289.
p. 392.

As a matter of fact this identification of warehouse stock requires to be carried a stage further, at least as regards complete product, namely, to the extent of giving a progressive number to each article.

Very commonly progressive numbers are given as consecutive numbers in one continuous series irrespective of manufacturing orders. These result, as for instance, in the case of typewriters, in high numbers being reached with the advantage of the numbers being relatively indicative of date of production. This advantage is not always a desirable one perhaps, when dates of production bear on selling prices, and there is not uncommonly a misleading element in these numbers if, as is usually done, blocks of progressive numbers are allotted to each manufacturing order when issued. The sequence of actual production may then have no sort of relation to the sequence of progressive numbers, and may be many months out when production under an order is delayed or suspended.

A little difficulty may arise as to progressive numbers when many lines of product are made, each involving a distinct sequence in continuous numbering. Another point, too, is the use of marking machines for applying straight numbers, such as result from the continuous method of numbering.

When these considerations do not weigh, the better plan may be to number the complete product consecutively for each production

order separately. This gives a double-barrelled number as 1387-1, 1387-2, etc., but identifies the product in the essentials necessary for internal reference and conveys little impression one way or the other to the public. Alternatively a design index no. may be used. Identification
of Works
Product.
F 47

When faults of design eventuate after the product has been despatched, the production order number conveyed by the progressive number will be illuminating. A single cross-reference in the case of continuous numbering will, for that matter, put that method on the same footing, although there is no denying the advantage, mainly from the administrative point of view, that lies in avoiding the necessity of cross-references. F 43.

Whenever progressive numbers are adopted they ought, generally speaking, to be quoted on the respective advices of despatch and sales invoices. F 113.

A reasonable corollary of any numbering scheme is that there shall be a progressive number register, wherein the numbers taken up shall be indicated with suitable details as to design and a completing entry for each item of the sales order under which it has been despatched, under some circumstances giving the customer's name to facilitate finding the necessary identification of any product from the correspondence file should the customer not quote same. By including the progressive number on the invoice this use of the register may be less frequent. F 107.

Registers of this sort will for some businesses be invaluable, while for others they will not be worth the labour. There may easily be a distinct advantage in adopting the identification scheme without a complete register being attempted.

Where stock production order references are utilised for progressive numbering, it will be necessary to avoid grouping various sizes or kinds of product under one reference. This point holds good for other reasons, particularly as to stock control.

In the appropriation of stock that is not immediately available for despatch in that it is not yet delivered to the warehouse, it will usually be safer not to appropriate any particular progressive numbers. Anticipations of this sort have a way of not working out, unless some special feature leaves no other course open from the beginning.

Progressive numbers really only come into force when erection is commenced, and the appropriation of a particular number to any specific sales order is best deferred until the erection reaches the stage at which special sales requirements must take effect. Alternatively, in the case of products where erection or building up constitutes an early stage, such as a chassis frame or boiler shell, then the progressive number requires to be applied at that stage F 102.

**Progressive
Numbers.**

and maintained right through as a reference. The only point, then, is that the appropriation of the respective progressive numbers to particular sales orders shall be left to the final erecting stage if possible.

This is aside from strictly warehouse stock, which may be taken as only amenable to such sales requirements as can be met after the product reaches the warehouse.

**Warehouse
Stock
Control.**

Turning more directly to stock control, it may be taken that the warehouseman will apply to the proper quarters for further stock
F 57. sanctions, involving the issue of stock production orders, as the products in hand or on order fall below the accepted ordering level by reason of despatch or sales appropriation.

This routine may be regularised by using a separate duplicate
F 106 memorandum book with the sheets endorsed by rubber stamps,

" Application for Warehouse Stock Sanction,"

with spaces for stating unappropriated stock in hand and in progress, and sales statistics for the preceding twelve months and also current year to date, expressed as monthly averages.

Deliveries to the warehouse of stock product require to be accom-
F 108 panied by a works product note quoting the inspection certificate
F 9c reference under which the product was accepted by the work depot from the shops. The inspection certificate, under some circumstances, would go direct with the completed product to the warehouse from the shops. This would obviate a separate works product note. This inspection authority may conceivably be vested in the assistant works manager, if his qualifications and opportunities allow. There will usually be some scope for judgment as to finish and possibly as to satisfactory efficiency under test.

F 110. The warehouse stock records must provide for advance appropriation. Deliveries to the warehouse will be duly entered from the works product notes and sales appropriation will be indicated by pencil entries to be inked in as the items are despatched. It rather simplifies matters if the stock received from the works is entered down in as many lines as there are items, that is one unit per line. The appropriation can be entered in the same way. Further, in the column provided for quantity on order from the works, these can also be entered in consecutive numbers—one per line—thus showing almost graphically the quantity in hand, the quantity received, the quantity to come, and the quantity appropriated.

F 117 Despatches from warehouse stock will be reported to the works accounts office daily.

The essential routine as to deliveries of product to the warehouse, whether made under a stock production order or under a sales production order, has been summed up in stating that an inspection certificate should be furnished as to every item of completed product before it leaves the shops for the work depot or warehouse. In this connection the value of progressive numbers is most marked. Final Inspection. p. 165.
F 59.

The individual erection specification cards, in the form of erecting orders, may, as an alternative to a separate inspection certificate, be signed as to inspection. F 107.
F 50.
F 102.

Where progressive numbers are not particularly necessary at the erection stage, or where, as in the case of small products, there is hardly any erection stage to be considered, the progressive numbers can probably be put on by the inspector, constituting his hall-mark.

Under some conditions, especially where special erections are concerned, it may be economical for the drawing office to carry out the final inspection, checking against the specifications pertaining to the sales order.

Apart from this final inspection there may be occasion for a test certificate to be issued, as in the case of motors guaranteed to give not less than a specified horse-power or valves to stand a certain pressure, before the product can be accepted into stock. The certificate can often be usefully in the form of a label.

Despatch of product from warehouse stock must be subject to a final inspection, to insure that the product is complete in every way at the time of despatch, and that all accessories and spare parts have been correctly selected.

Final inspection may need to include the certification that all necessary patent nos., registered design nos., or trade marks or the like have been marked on the product.

In drawing up the instructions to the inspector, regard needs to be paid to the legal aspect, as to which the following extracts indicate some of the points.

Extract from the Patents and Designs Act, 1907.¹

A patentee shall not be entitled to recover any damages in respect of any infringement of a patent granted after the commencement of this Act from any defendant who proves that at the date of the infringement he was not aware, nor had reasonable means of making himself aware, of the existence of the patent, and the marking of an article with the word "patent," "patented," or any word or words expressing or implying that a patent has been obtained for the article, stamped, engraved, impressed on, or otherwise applied to the article, shall not be deemed to constitute notice of the existence of the patent unless the word or words are accompanied by the year and number of the patent:

Provided that nothing in this section shall affect any proceedings for an injunction.

If any person falsely represents that any article sold by him is a patented article, or falsely describes any design applied to any article sold by him as

¹ By permission of The Controller of H.M. Stationery Office

**Final
Inspection.**

registered, he shall be liable for every offence, on conviction under the Summary Jurisdiction Acts, to a fine not exceeding five pounds.

If any person sells an article having stamped, engraved, or impressed thereon or otherwise applied thereto the word "patent," "patented," "registered," or any other word expressing or implying that the article is patented or that the design applied thereto is registered, he shall be deemed for the purposes of this section to represent that the article is a patented article or that the design applied thereto is a registered design.

Extract from Designs Rules, 1908.¹

MARKING OF ARTICLES.

Before delivery on sale of any article to which a registered design has been applied, the proprietor of such design shall cause each such article to be marked with the word REGISTERED, or with the abbreviation REGD., or with the abbreviation RD., as he may choose, and also (except in the case of articles to which have been applied designs registered in Classes 9, 13, 14, and 15*) with the number appearing on the certificate of registration.

* Textile Goods.

In some businesses final inspection is carried through largely by the customer's own inspectors, and the works inspection is relieved to some extent. Against that must be set the importance of knowing that everything is right before the day on which the customer's inspector is to call. If the work is not right, he ought obviously to be advised in time to save an unnecessary journey; what is no less important, a vain journey tends to lower the prestige of the firm.

A point may be made here as to the wisdom of providing every facility possible for inspection, so that a visiting inspector's time and temper shall be saved. This consideration must always tend to better feeling between parties, and all goes to establish a good reputation.

There is no more than reasonable business courtesy in attending also to the personal convenience of customer's representatives while at the works, as, for instance, providing luncheons when such a course does not seem an attempt to put the visiting inspector under an obligation.

**Sales Order
Routine.**

Where warehouse stock is held, the sales orders will be susceptible to being filled from stock without the intervention of drawing office or works.

F 12.
p. 12.
p. 22.
p. 324.
p. 442.

There will be other cases where the order may be filled by slight modification of stock product.

Oftentimes sales will be effected of standard product that may in some cases be kept regularly in stock, and in other cases be made only to meet specific sales orders. In the latter case the production may very well be carried out under the sales order number, rather than make the isolated items for stock under a stock production order.

F 49.

¹ By permission of The Controller of H.M. Stationery Office.

As to the case of a customer's order covering a range of products, some in the category of warehouse stock and some of a special character, it may be better to issue separate sales orders for the different lines, insuring the necessary cross-reference by giving the *despatch instructions* on one order only and connecting the other thereto. Sales Order Routine.

In issuing the sales orders delays may be avoided if no discrimination is attempted in the first instance, as to whether the goods will come from stock or be specially made.

Whether it is expedient to have more than one series of sales orders or not, those that have to be treated as production orders, in that the product required has to be specially made, need to be issued accordingly to the works manager, drawing office, production office, and inspector at least. As this is likely to entail retyping, a separate production order series may be adopted with its own sequence of numbers, if that is preferred to using a broken range of sales order numbers.

The fewer necessities for cross-reference the better, and the argument is rather in favour of one series only of sales orders, and for sales order references to be applied to production orders as required by using a qualifying letter P as suggested on page 12.

It is obviously important that there shall be no confusion as to how orders are to be filled. A suitable routine will be to issue a complete set of all sales orders to the warehouse—and also to the general office for invoice reference—and to also supply the warehouse with a copy of all production orders issued to the works, whether under the sales order reference or other reference. They could enter on their copy of the sales orders the date of the production order, thus making plain the items supposed to come from warehouse stock.

It may be convenient for the production office to be a party to the issue of production orders, but in any case the problem of specifying delivery due dates favours the responsibility being put on the production estimator as to filling in these particulars on the production orders. The responsibility of the production office is to arrange matters so that the works shall live up to these delivery requirements.

So far as sales repairs and sundries orders are concerned, the routine matters discussed for sales orders apply equally.

For spare parts and the like, the form of stock control records suitable for materials will apply more conveniently than warehouse stock record cards on which the items are traced individually by the progressive numbers.

**Sales Order
Routine.**

In any case progressive nos. can hardly apply to spare parts.

- It may be especially important to have test certificates before releasing repair jobs.

In the case of cash sales, which figure in some businesses, the cash sale receipt can be designed for filling in all the details as would be given on a sales order. An extra carbon copy of this receipt can then serve in lieu of a sales order.

- F 113. Incidentally, if the goods are sent off the day the cash is received, there will be no occasion for an advice of despatch, the cash sale receipt serving this function if endorsed—"Despatched per."

Where counter sales are made, the warehouse, or department effecting the sales, comes under the Shops Act.

Extracts from the Shops Act, 1912.¹

On at least one week day in each week a shop assistant shall not be employed about the business of a shop after half-past one o'clock in the afternoon.

Every shop shall, save as otherwise provided by this Act, be closed for the serving of customers not later than one o'clock in the afternoon on one week day in every week.

**Warehouse
Requisitions.**

The warehouse will frequently have occasion to request work to be done by other departments, and even where the making of packing cases, for instance, is done within the warehouse, formal instructions should be issued each time.

- F 12. These requests and instructions may be issued by the warehouseman on his own initiative—acting always under an official sales order—and may be designated warehouse requisitions.

- F 106. They can be made to cover minor modifications of warehouse stock necessary for filling sales orders as well as for making packing cases as already mentioned.

Efficiency in this direction can hardly be effected without individual instructions, against which material and time can be booked.

A further development of warehouse requisitions will be to make them cover demands by the warehouse from the general stores as to stock material, most frequently standard fittings, called for under a sales sundries order. The warehouse requisition as lodged at the general stores can also serve all the purposes of a goods issue

- F 86. voucher.

- F 55. Similarly, in the case of spare parts required to be specially made by the works, the warehouse requisition can be issued to the works office, who, after arranging as to material (probably from reserve stock) may pass the order on to the work depot, accompanied by a goods issue voucher for the rough material.

The works office may override a warehouse requisition by marking it as to its being met from a stock production order in hand

¹By permission of The Controller of H.M. Stationery Office.

at the time, or they may issue such an order sufficient to more **Warehouse Requisitions.** than meet the moment's requirements.

It will be desirable for the warehouse requisitions to have a coupon attached, that is a perforated portion, that will be filled in as to ^{F 159.} expected delivery—quoting stock production order concerned when necessary—and returned by the works office to the warehouse. The warehouse will mark these expected deliveries on the sales order concerned, and file the coupon in sequence of delivery dates so as to follow same up methodically by enquiry at the work depot. Customers' protestations may conceivably necessitate varying the sequence in which orders should be met and this must be arranged for.

The accounting routine will necessitate a carbon copy of each warehouse requisition being sent by the warehouse to the works accounts office.

IV E DESPATCH

Final Records. THE necessity of final records as to finished weights or final fitting up of any goods prior to despatch, will partly depend on the nature of the business, and, as to the final fitting up, mainly on whether

F 50. the erection is done to drawings or to written instructions or specifications. Usually a progressive no. should be sufficient record,

F 102

F 99. more especially if the inspection certificate quotes the progressive no. thus linking up with the records in the progressive

F 107. no. register.

The advantage, or rather necessity, of taking final records of products hinges on how far product is erected according to unwritten shop practice—certain brief descriptions being sufficient instructions to the shops, but not constituting adequate record after a lapse of time, or at any time, in the hands of new comers.

F 47. The point is made here as a reminder that it may be expedient to pick up the loose ends of the product history by developing the warehouse work accordingly, as to precisely how different customers' or different countries' established requirements are met.

F 109 Recording finished weights is a fairly simple proposition, but recording final fitting up may call for the services of a technical man.

The greatest value of this arrangement, although, perhaps, not within warehouse jurisdiction, may lie in recording the alterations in fitting up or general arrangement consequent on repairs being carried out.

The drawing office will be the most concerned with all this work, and might supply the man to do it. This representative may be the one to carry the responsibility of checking goods against sales orders and specifications before allowing their despatch.

It is likely to be of much value if a daily notification of orders completed is sent to the works office and works accounts office with a view to closing up all records promptly.

There remains now, for discussion, the routine of despatching goods **Despatch Routine.**

The first point is as to making out a contents list for each package of the items included. This is a very desirable course and has an important function in making for correctness in consignment and the substantiation of claims, whether from the customer as to short delivery or against the carriers as to missing goods.

p. 284.

When a packing slip or contents list is made out it should be sent with the package either under the label or tacked on, or in an envelope label rather than put inside in the package.

Some firms send with their goods plainly worded notices after the following style :

These goods were checked by our Inspector, and therefore known to contain all that the Packing Slip calls for.

UNPACK WITH CARE.

Most apparent shortages arise from Goods being left in Packages or thrown out with the Packing. Your own experience will confirm this.

Package No. Date Inspector

The extra clerical work suggested by the use of packing slip is very largely offset by allowing a proportionately briefer description on the advice of despatch.

F 113

When machinery details are not in question there will probably be less advantage in using packing slips, as all the information can be given on the advice of despatch.

In the matter of the advice of despatch, its most important function is in relation to the general office for invoicing purposes, though this requirement can be met, if inconveniently so, by a despatch book passed between the warehouse and financial department on alternate days (that is, one book for Mondays, Wednesdays and Fridays, and another for Tuesdays, Thursdays and Saturdays). This arrangement tends to cripple the work in both departments, and does not allow the despatches to be invoiced so quickly. The quickest way of all is to make the invoice out in blank as a carbon copy of the advice.

The customer is entitled to an advice of despatch, and this copy should go by post, in case the goods are delayed in transit, and to inform the customer at his office, as distinct from the goods arriving at his works. Sometimes the invoice is the only advice.

It is desirable to have each advice state whether the consignment in question is final or only partial, and if partial, whether first or later part. A separate advice should be used for each sales order concerned.

The commission charged by shipping agents for arranging shipments, and making out bills of lading, are based on the number of **Shipments Overseas.**

Shipments
Overseas.
p. 58.

shipping tons, plus all dock dues and such charges. The usual course is to employ shipping agents to arrange all details of shipments, including insurance as to safe arrival of goods.

In regard to weight or measurement the rule for over-sea freight charges is as follows :

“When a package measures more than it weighs, freight shall be charged by measurement, and when a package weighs more than it measures freight shall be charged by weight.”

A ton by measurement is taken as forty cubic feet, while a ton by weight is twenty hundredweight.

Incidentally a useful legend for posting in the export packing room is as follows : “*Every inch you save in packing space saves shillings in freight.*” This will be true in enough cases to justify the notice and must stimulate attention.

Transport by
Rail.
p. 275.
p. 293.

In the case of goods sent by rail, a consignment note will have to be made out and it will be desirable for the sender to use a printed form of his own, clear of all qualifying clauses on the part of the railway company and arranged for the making of carbon duplicates.

There does not appear to be any authority under which railway companies can compel traders to adopt the railway company's consignment notes, except in the case of explosives and other dangerous traffic. A consignment note, when signed, makes a binding contract between the carrier and the trader.

The description of goods given on the consignment note should be stated in the terms that will secure the most favourable rating for the goods in question.

To this end it is necessary to consult the “Classification of Merchandise” issued periodically by the railway clearing house.

In the matter of rates, these vary according to the amount of risk carried by the sender.

Where a rate at owner's risk is provided, the prescribed form of risk note must be signed by the consignor to entitle him to that rate, otherwise the ordinary rate is charged.

Signing a risk rate does not free the railway companies from responsibility where the loss or damage is due to any negligence on the part of their servants.

The railway companies are bound to keep rate books at their stations which shall be open to inspection, and this fact has been taken advantage of by certain publishing firms to extract all these rates and publish them in book form.

The great value of these books lies in the information as to all special rates in force from or to any particular stations. No individual trader could very well collect this information even for his known needs without much trouble, and there is always the liability of new needs arising.

The railway clearing house classification is usually included in the rate books together with important notes on the various practices of railway companies in relation to goods traffic by merchandise and passenger trains.

One such pre-war publication¹ gives the following useful notes:

Notes for persons checking Railway accounts and charges.

1st. See that the entries shown on account are correct, and that the charges are payable by you, also that the amounts are correctly cast.

2nd. Refer to the exceptional rates and ascertain if the particular goods are provided for by special rates; if not consult the classification for the required traffic and apply the Class Rate applicable.

3rd. If your traffic is constant, and in large quantities between your station and some other point, you are entitled to ask the Railways interested to provide an exceptional rate for the traffic, if not already in force.

4th. In view of the amalgamations now taking place, it is well to remember that one of the purposes of Section II. Act 1873, is to prevent rates being raised as a consequence of amalgamation. Rates cannot be raised unless necessary to secure a fair return on the traffic. Also that the Railway Commissioners have power to order that no higher charge shall be made in respect of merchandise carried over a less distance than is charged for like merchandise over a longer distance, on the same line of railway.

5th. Where rates to small villages are not shown, the rates to the nearest town will be sufficient guide.

The advances in railway rates must bring home to every trader the importance of checking his railway accounts very closely.

Overcharges are liable to occur as to rates charged, as to weight charged for and as to "paid on" charges. "Paid on" charges arise through the absence of a through rate, when goods travel over more than one company's lines, and represent the charges payable or estimated to be payable, between the companies when the goods are transferred. Application should be made in such cases for a through rate to be arranged, and any excess charges should be claimed for.

It is quite important to have a ledger account with the various railway companies, so as to allow time for properly checking the charges.

In the matter of claims it must be borne in mind that the party on whose behalf the contract is made, is employing the railway company as carriers, and he it is who must make a claim in the event of damage or non-delivery.

¹ *The London Railway Rate Book.*

**Transport by
Rail.**

These claims should be definitely embodied as a statement of account against the railway company and payment looked after accordingly, rather than left in the form of correspondence only.

It is of first importance for substantiating claims for damages and shortages that a clear signature shall not have been given, and this should be impressed on the consignee—either on the advice of despatch or on the address label, or may be on both, requesting him to sign as “unexamined.”

Valuable assistance in negotiating with railway companies as to rates may be obtained through the medium of such bodies as the Machinery Users Association and Mansion House Association on Railway and Canal Traffic. Some Chambers of Commerce also provide this class of service to members.

The foregoing remarks reflect conditions that are expected to pass as the Ministry of Transport develops its functions but the new era foreshadowed by a co-ordinating control is not yet established, and obviously will take considerable time.

**Transport by
Works
Vehicle.
P. 293.**

It will be well to investigate very fully for the particular works conditions the saving to be effected by making deliveries by a works vehicle, either to customers or to railway stations. In the latter case a rebate could be claimed each month, except when goods are consigned “station to station” (S to S) rate. Delivery requirements at the consignee’s end may mean despatching under “collection and delivery” (C and D) rates, and it is the collection that may be undertaken by the works vehicle instead of the railway company doing it. Rebate needs to be claimed accordingly each month. Signatures in this event are obtained at the station on the warehouse copy of the consignment note previously mentioned.

In case of goods received from suppliers, rebates may be earned by carting from the station to the home works.

F 113- When goods are delivered by a works vehicle, the routine as to advice of despatch requires to be such that the signature as to receipt be obtained by the carter on delivery. As this will be away from the warehouse, the signature cannot be given very well on the fast copies in the advice of despatch book as retained by the warehouse. A common alternative is to have a carter’s book in which the necessary details of each delivery are written out again.

Packages.

Apart from the routine of getting packing cases or other packages made, there will be questions as to the charge to be made to the

customer. This may be said to be a matter of financial accounting, **Packages.** but it may be taken as very convenient practice for the warehouse to fix the price of packing cases. It may be well enough to work to a scale per square foot of area, varied according to the style of case and thickness of timber, or alternatively the costs may be taken out. This detail costing will be made possible by the warehouse, and with a minimum delay, if entries of all material and labour spent are made **F 105.** on the back of the respective warehouse requisitions for the making of cases.

The value of each package sent with goods should be filled in **F 113.** on the advice of despatch by the warehouse. This leaves the general office to charge or not as they may deem advisable.

Some customers will decline to pay for packages, and this involves arranging for the return of packages to be followed up promptly, as it becomes very difficult to recover the value of a package that has been away a long time. Not only that, but the later traffic in packages confuses the records, and any serious attempt to clear up old package items is likely to be tedious and to be resented by the customers.

The remedy lies in keeping track of all packages and not letting them lie unheeded at the customer's works.

The first difficulty, and, perhaps, the only difficulty, is that of identification, and to this end every package should be numbered. **F 114.** Package tracing cards in sequence of numbers will be a sufficient register.

The package number should be taken up before issuing the warehouse requisition for making it, and this number should be branded, if a timber package, or painted on the package as part of the process of making.

The package numbers will appear on the advice of despatch and on the acknowledgment of goods received or credit note when the **F 83.** package is returned. The system of acknowledging goods received, as mentioned elsewhere, is intended to deal with receipts other than purchased goods, and will mainly deal with receipts from customers. By means of a suitable endorsement such as

p. 297.

" this form constitutes a credit note of the value indicated "

the acknowledgment can, in the case of packages, obviate the necessity of a further credit note. For the warehouse to fill in the value should mean no more than a reference to the packing tracing card under the respective package number.

Enquiries as to the return of outstanding packages should be made through the general office, who will discriminate as to the necessity or use of applying for their return. The list supplied by

Packages

the warehouse for this purpose, say, at the end of every fortnight, as to packages despatched in the preceding fortnight, will be marked accordingly and sent back to the warehouse and the remarks noted on the package tracing card. The cards referring to packages which are not likely to be returned by the customer can be transferred to a "dead" cabinet.

WORKS ACCOUNTING

V

ADMINISTRATIVE RECORDS

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V A

ADMINISTRATIVE RECORDS—INTRODUCTION

WORKS accounting falls into two broad divisions, viz. :

**Definition of
Administra-
tive Records.**

- (1) Administrative Records.
 - (a) Labour.
 - (b) Material.
 - (c) Plant.
- (2) Cost Accounts.
 - (a) Cost Allocation.
 - (b) Cost Returns.

The term administrative records is to a large degree self-explanatory as implying the records essential to administration. It is necessary, however, to be clear which records shall be considered essential.

Taking the case of wages paid, it is not unreasonable to consider as essential a knowledge that adequate services have been rendered. It obviously follows that production statistics are not only within the compass of administrative records, but vital to efficient administration. In presenting the subject generally, it has been found convenient to give some discussion to the principles of production statistics under various aspects rather than defer their consideration entirely to this stage of the book.

As a matter of definition, rather than as a vital issue of principle, production statistics may be held to be statistics as to output expressed in terms of time, numbers or plant employed, or bulk of material used. If the statistics are extended to include the cost of production then, also as a matter of definition only, they are considered for the present purpose as cost returns—a subject separately discussed in Section VI G, p. 565.

Keeping to the definition aspect, labour administrative records are, in turn, held to be those records pertaining to the administration of the individual employed—in that sense essential in every factory apart from the larger considerations of production efficiency that administration naturally suggests.

**Definition of
Administrative Records.**
p. 275.
p. 371.
p. 386.

In the matter of material, this has a certain individualistic aspect as to its custody and consumption, but these come either under the technical aspect of material control, to which Section IV is mainly devoted, or under the aspect of stock accounts, which are, in effect, one form of administrative record, though only indirectly of individual application. Although a works may be run for a time without records of material consumed, when it could not even start without some sort of wages system, yet stock accounts which necessarily connote stocktaking, are vital to efficient administration, apart from their application to cost allocation, if only that the financial values involved constitute an item of expense in point of the interest or hire of capital lying idle. Information as to monetary values is a practical necessity for enabling the management to maintain a true sense and measure of efficiency in the control of materials.

It is necessary also to consider records of plant expenditure as a possible instrument of administration, more especially if the term plant, for this purpose, includes buildings, machines and tools,

The capital invested in plant is usually large and the interest or hire of capital for this purpose alone constitutes a notable item for production costs. Beyond that there is the more important question of depreciation and obsolescence, and its corollary, valuation as assets in the annual balance sheet.

The treatment of expenditure on plant has, therefore, an important bearing on the commercial aspect of manufacturing efficiency and should reflect the technical efficiency of the plant in question.

While discussion on these lines might not be out of place under cost accounts, the technical considerations associated with these matters make their inclusion in the present section desirable; as falling definitely within the province of the technical manager.

p. 20. A further point is that labour administrative records, stock accounts and plant records derive all their value as a basis for cost allocation from technical direction. Together they constitute the frontier line up to which the technical manager must not fail to go to meet the accountant rather than that it should be necessary for the accountant to pass this line to meet the technical manager.

The various considerations in question are therefore dealt with under the following heads :

- | | |
|----------------------------|--|
| (1) Employment Records. | (6) Stock Accounts. |
| (2) Timekeeping. | (7) Stocktaking. |
| (3) Timebooking. | (8) Plant Records. |
| (4) Production Statistics. | (9) Depreciation and Valuation of Plant. |
| (5) Wages. | |

V B

EMPLOYMENT RECORDS

SOME of the circumstances attaching to employment records are referred to earlier under Works Enquiry Office. It will be convenient here to deal first with the question of giving a reference number to each worker, by which he may be identified wherever and whenever any record is made in connection with him. This number is almost universally known as his check no., whether a metal check system is in use or not—an alternative term sometimes used is "ticket no.," ticket being another name for check.

Identification
of Workers.
p. 237.

A common method of numbering is to have one series of numbers for the whole works, *i.e.* no. 1 and up, and to reserve blocks of consecutive numbers for the various departments. This gives a general sequence of numbers for wages and other purposes, and serves to connect a worker with his department, providing the reservation of numbers for each department is sufficient in the first instance to meet expansions and developments.

An alternative method is to number separately for each department, using the department letters to qualify each series, *e.g.* A 1 and up, B 1 and up. This assumes that the departments are symbolised by letters, which should be done on other grounds also, as providing a standard abbreviation in all records pertaining to the respective departments.

The advantage in the latter method is that there is no limit to the numbers available, thus avoiding any occasion to make a general move of numbers, if one department grows unexpectedly.

It will be an advantage if the numbers allotted to each department are grouped as to adults and juniors. By juniors is meant young persons under eighteen years of age, to whom special Home Office restrictions, under the Factory Acts, apply, principally as regards overtime and time between meals. The principle may be extended, advisedly, to the separation of skilled adult workers from

p. 193.

Identification of Workers.

lesser skilled and is particularly desirable when different scales of overtime allowances apply to the two groups.

The sequence otherwise of the numbers in each department can be in order of engagement. Numbers falling vacant should not be taken up again in less than three or more weeks, dependent on the methods of remuneration in force.

In view of the individual output and tool loan records, that are admittedly necessary nowadays, it is worth the more consideration to adopt a scheme of numbering the workers that will not necessitate their identification numbers being altered except at widely separated intervals.

p. 240.

In the case of apprentices, who change from department to department, and whose records would be confused by a consequent change of numbers, the difficulty is overcome by giving them registration numbers, outside the range of numbers likely to occur in any department. To this number is added the symbol of the department in which the apprentice is employed at the time. For example, Apprentice No. 500 would be known as A 500 while in Department A, as B 500 in Department B, and so on.

Engagement of Workers.

F 16. It is desirable that particulars of each applicant be taken down at the works enquiry office on a suitable form.

p. 239
p. 340.
p. 367.

The practice of enquiring as to which trade union an applicant belongs is of dubious use seeing that no works would to-day contemplate excluding trade unionists as such, and it is apt to convey an undesirable impression without any compensating advantage. Any enquiry at all on such matters should be made in the course of conversation by the foreman responsible for recommending the engagement of any applicant.

The particulars taken down by the clerk should be certified by the applicant and the form in question passed to the foreman on interviewing him.

As the applicant should sign as seeking engagement "subject to the works regulations in force," he should be afforded an opportunity of consulting the works regulations before doing so. The whole question of works regulations is discussed on page 247 *et. seq.*

The issue of works admission cards to workers on definite engagement, as suggested on page 250, confers certain advantages in large works where workers do not readily become known at sight by more than their immediate foreman.

F 17. The practice of sending to an applicant's previous employer for his character before actually making the engagement was largely waived during the war owing to the shortage of men.

In view of the high time rates obtaining for any degree of skill some precaution seems necessary to confirm that each applicant's statements as to capacity are correct. Enquiries of this sort take time—unless they can be made by telephone—and the worker is put to loss of wages while the matter is being settled. The Employment Exchanges do not collect evidence on this head; they merely take the worker's own statement before sending him forward. Membership of a skilled trade union ought to guarantee a reasonable standard of skill, but there are exceptions, so that the employer must take his own precautions.

Engagement
of Workers.

Enquiries beyond the point of the worker's skill in his calling cannot be pursued to any length with much advantage because his failings as observed at his previous employment may be the outcome of conditions rather than an unalterable fault of character. It is really for the new employer to find out for himself such issues as timekeeping and conduct.

The whole case would seem to be met by the practice becoming general of issuing to workers, on leaving, a discharge paper indicating clearly the class of service rendered and the period of service. To prevent fraud by forgery, the new employer could send asking the previous employer for confirmation of the facts stated on the discharge paper, but in the meantime the applicant could be engaged, and if fraud appeared of this nature the engagement could be summarily terminated.

F 148.

If some employer, on a fine point of economy, declined to issue discharge certificates on these lines, the worker is no worse off than he is to-day. The matter seems to be one for mutual agreement by the joint industrial councils in industries where these exist.

It is desirable that the rate of wages proposed by the foreman for any new employee should be stated at the time of engagement, and not left open for the wages office to find out afterwards. Each foreman should have a list of the normal rates of pay authorised by the management. The district rate, stipulated to be paid in the district by particular trade unions, will leave the management little choice in many cases but otherwise there can be either a fixed normal rate for a particular class of work or perhaps a range of rates. A foreman should not be discouraged from fixing a trial rate, when he is able to, for an applicant, not entitled to the full district rate, whose skill is in doubt, and should be allowed to advance it at quite an early date if the worker clearly shows he is worth more.

In the case of juniors, there is apt to be unreasonable variation in the commencing rate of pay without some definite scale is adopted. It seems only fair to pay according to age in the first instance, and

p. 240.

**Engagement
of Workers.**

then to advance at intervals of six months according to merit, there being, however, an authorised margin of a few shillings a week according to age, above the minimum rate. Merit should be viewed broadly and include consideration of educational as distinct from trade progress.

These remarks apply equally to indentured apprentices.

p. 215.

The large number of men seeking employment in industry, who are disabled in one way or another through the war, calls for special recognition in the arrangements for engaging men. The most direct course to get the best results, while affording the maximum help to these men, is to have a works medical referee, as discussed earlier, who can examine them before engagement to ensure their suitability for the work or conversely the selection of work suitable to them. These cases require, after engagement, sympathetic watching, which only a medical man can give without encouraging malingering—a temptation to which a man succumbs at the peril of his entire *morale* and self-respect.

p. 189.

Reference has been made elsewhere to the functions of a labour co-ordination officer in works of any size, and it is recommended that he should have the oversight of the works enquiry office where applicants are first interviewed. This arrangement reacts appreciably on the procedure for dealing with workers throughout their employment.

p. 255.

After a man has been engaged it may be assumed that he will be subject to advance in wages or transfer to other departments.

F 18. To regularise these changes a wages advice slip should be made out by the foreman and passed to the works manager for approval and issue to the wages office.

**Discharge of
Workers.**

F 20.

There is the further stage of discharge or paying off when a discharge note will be required of the foreman, in each instance stating reason for discharge, the worker's ability at his calling, and his general conduct.

Alternatively this step may not be left entirely with the foreman but be dependent on the foreman first notifying his recommendation to the labour co-ordination officer, who in turn after noting the timekeeping record would seek authority from the works manager to proceed with the discharge. This routine is provided for by

F 146

the labour notification form referred to on page 191.

It is found in practice necessary to leave the foreman free to deal on the spot with flagrant cases of misconduct should they arise. In such an event, the labour notification form must make the position clear that the worker is summarily dismissed on the grounds indicated and would be accordingly dealt with as an emergency

matter by the co-ordination officer or works enquiry clerk acting on his behalf. Discharge of
Workers.

It will be necessary, that, before any worker is paid off, he shall have returned to their proper stores any tools or drawings he may have borrowed. For this purpose some notice is necessary to the tool stores to see what tools, etc., are on loan, and when, in due course, these are returned, the workman requires to be given a tool clearance receipt, which he can hand in to the wages office when claiming ^{F 21.} his wages.

The tool clearance receipt can be arranged as a counterfoil of the form used for advising the tool stores of the impending discharge.

Deductions from pay, if duly posted as a standing regulation, may be made in respect to tools and tool checks missing through negligence, on the understanding that the deduction will be refunded when the missing articles are produced. p. 255.

It is desirable to establish a simple routine in connection with the temporary suspension of men when work is short. A discharge note may be used suitably endorsed and the routine as to a tool clearance receipt carried out as in the case of a final discharge.

The wages office may conveniently prepare workers' discharge ^{F 148.} papers, certifying the length of service and capacity in which employed.

V c

TIMEKEEPING

**Functions of
Timekeeping.**
p. 76.

THE functions of timekeeping may be summed up as follows :

- To prove attendance at work.
- To maintain punctuality.
- To record absence.
- To compute the time worked.
- To compute overtime allowances due.

All of these duties are normally either performed or supervised by the time office staff under a chief time clerk or timekeeper. The term timekeeper is the older term, but is not quite appropriate in conjunction with mechanical time recorder^s now so widely used.

The work of the time office usually goes rather beyond that of timekeeping as stated above and, in varying degree, is also associated with the following matters :

- Home Office requirements as to registers and notices (p. 196).
- Accident records and Compensation correspondence and payments (p. 229).
- Pay queries (p. 254).
- Insurance Company's requirements as to notices of accidents and claims (p. 256).
- Shop clocks and bells (p. 261).
- Gate control (p. 262).

These matters are dealt with under Labour Administration—Section III—on the pages to which reference is made above against the respective items.

The duties that have also been indicated under Labour Administration on page 239 as pertaining to a works enquiry office, are, more often than not, merged with those of the time office, which would mean adding the following to their duties :

Interviewing of applicants.
 Employment records.
 National Insurance requirements.
 Discharge routine.

Timekeeping.
 p. 336.

The province of timekeeping in its more limited sense will be appreciated very readily from the works regulations suggested in that connection, viz.: Entering and leaving the works (p. 251), and Lost time (p. 254.)

These works regulations, as given, are from actual practice, and for that reason cannot reflect all the different conditions existing in various works—notably as to the method of recording attendance.

The long established method of checking men in and out of the works by means of a system of metal checks, has given way largely to the more convenient method of mechanical time recorders.

Time Recording.
 p. 76.
 p. 261.
 p. 335.
 p. 361.
 p. 445.

The metal check method is being operated to-day in large works with apparent success, by virtue of its well rooted establishment, and the consequent selection of suitable men to look after the system. It is, however, open to grave abuse which the very system itself makes proof of abuse very difficult.

The peculiar advantage of the mechanical time recorder is that by its use all disputes as to time are avoided. In the metal check system however much supported by mechanical contrivances for closing the check boxes at appointed times, if there is any dispute, it is only the word of the timekeeper against the worker (at least that is the worker's way of looking at it).

The avoidance of disputes by the use of mechanical time recorders only applies fully with the card type of machine, where the worker sees for himself the time he has recorded. The sheet type, with a radial arm for punching in the respective holes for each check no. is only a makeshift, and does not meet the requirements of efficient administration.

In practice the use of a mechanical time recorder (card type) does much more than obviate disputes as to time, as by removal of the personal element a rigid adherence to the time of attendance can be insisted on without incessant warfare between the worker and the timekeeper. In any case the record made is beyond all argument, providing the recorder is registering the correct local time, and in this connection, it is the soundest economy to have all recorders and indeed all clocks synchronised, so as to keep identical time.

**Time
Recording.**
p. 267.

The Post Office authorities afford certain facilities, as the following extract from the *Post Office Guide* will indicate.

TIME SIGNALS.

Where the telegraph arrangements permit, Greenwich mean time can be supplied by electric current every hour in the day in London, and at either 10 a.m. or 1 p.m. (Greenwich time) to places in the country.

Where sufficient support is forthcoming, special arrangements can be made for the hourly synchronisation of clocks.

The need for synchronising will appeal to wider circles, as works efficiency becomes more and more recognised as the taking care of a myriad of small details. The general discipline suffers when the time recorders differ in different departments. The factory bells and whistles should all be automatically synchronised with the time recorders.

- F 22. The time card is essentially the record of attendance, as obtained by the use of a card type of recorder, and from which the time wages are calculated. The machine has to be set by the attendant, or is automatically set, for registering in the correct "IN" or "OUT" column, and automatically alters each day so as to bring the day spacings in the correct position—the change over from a.m. (upper line of each day) to p.m. (lower line) being adjustable to suit the working hours. Abnormal times such as late arrival and overtime can be indicated by a different colour stamping or by an asterisk, and it is certainly very helpful to have abnormal time distinguished in one or other of these ways.

A matter of some moment is the number of stampings that should be required. In practically all cases the workers stamp "IN" on every occasion of arrival, but usually only stamp "OUT" on leaving at night, unless working irregular meal hours, when they would stamp "OUT" for meals. In some cases, the stamping "OUT" at leaving off for the day is not required when leaving at the regular hour, but only when working overtime. The case occurs sometimes that stamping either "IN" or "OUT" for tea-time is omitted as robbing a short meal-time of a valuable minute or two. The settlement of what shall be done hinges on the gate control, but speaking generally, it will be well enough to waive the "OUT" stamping on going to meals, but to insist on the "IN" stamping after meals and the "OUT" stamping on leaving at night, whether at the regular time or not.

The keynote to proper administration of a time recorder system is that "only time recorder [or clock] stampings will be recognised." This rule should be printed on every time card and placarded on every recorder—apart from its inclusion in the works regulations. To condone forgetfulness is to encourage carelessness. Confirmation of attendance by reference to the

foreman, if accepted in lieu of stamping, entirely nullifies the **Time Recording.** rule.

It is usual for the time cards to be held in racks beside the time recorders, one set of racks being provided on each side—one holding the cards ready for stamping and the other receiving the cards after stamping. Racks with the number labels at the side are more convenient, and allow the freer use of department symbols—a point that counts most when several departments use the one recorder, as could be the case in all but the larger works. Separate recorders should be provided for each 150 workers to avoid unduly protracting the process of recording at a given time.

In settling the form of time card it is desirable to provide a separate column for indicating overtime allowances—the extra quarter or half time over and above “bare” time wages. The arrangement allows for overtime allowances to be readily allocated as such for costing purposes, but more particularly shows clearly the net hours worked, a necessity for proving the completeness of the time booking or allocation and again in arriving at the extra pay due under any system of payment by results. Extra pay is defined as the difference between the total piecework or premium earnings and the “bare” time wages for the time worked, exclusive of overtime allowances.

A matter of some importance in many works is the control of **Overtime Control.** To this end a proper system of overtime authorisation should be instituted. The form may be individual to each worker **p. 254.** or more economically be in group form, that is, all names of workers **p. 250.** ^{F 23.} required to work overtime are listed by the foreman and, after approval by the works manager, the list is passed on to the time office, who exercise control accordingly and only issue time cards in accordance with the authority received. If an exception is made, owing to apparently accidental omission of any name from the list, the chief time clerk becomes responsible for getting his exercise of discretion approved by the works manager afterwards.

Dealing with the question of punctuality, efficient gate control **Punctuality.** is necessary to the maintenance of a proper standard. The gates **p. 254.** should be closed strictly on the stroke of the hour appointed. **p. 250.** Unless the means adopted for recording time of arrival are installed actually at the works gates, some small margin of time for the worker to make this record must be definitely laid down in the works regulations.

This raises the question of whether the time recording system shall be centralised or departmentalised. The mechanical time

Punctuality recorder has an advantage over the metal check system of more ready installation in the various departments, but this does not provide for supervision of the process of recording or attention to the time cards.

On page 76 is illustrated an arrangement of a labour administration building in which is incorporated provision for a central time recording station with as many recorders as necessary to meet either the whole of the workers, or, in very large works, of those using any given gate. This centralisation does undoubtedly facilitate the time office work considerably, and it remains a matter of local conditions as to whether the theoretical advantage of the workers having to record their arrival in their own department does actually materialise in practice as an earlier start. In any case, there will always be a large proportion of workers who pass the gates just as they are about to close, and a reasonable time must be given them to reach their particular shops. If, therefore, the workers record their arrival at a central station on the way from the gates to their shop, there must be something radically wrong in the spirit of the works generally if there is deliberate dawdling, on the final part of the journey, just because attendance has been recorded.

p. 189.
p. 248.

p. 254.

The problem of dealing with the late-comer becomes more readily solved with the advent of a labour co-ordination officer, who can act impartially in the matter in accordance with the respective individual records. A spirit of fairness must regulate the decisions reached. It is not good practice to call on the foreman in this or any other administrative connection just at the time he should be concentrating on getting his shop under way. The labour co-ordination officer will discuss with the foreman concerned difficult cases that arise but there must run throughout his work in this connection *a careful evenness of treatment that shall not break down a high standard of punctuality or involve unreasonable hardships on individuals.*

F 149 The individual attendance chart referred to on page 214 in discussing the functions of a works medical referee, should be of hardly less importance to the labour co-ordination officer in determining how far a lateness ought to be viewed as a delinquency for which there is any right to press for reasons or convey a reprimand.

The desirability of instituting a timekeeping bonus will largely depend on its administration and local circumstances. Such a bonus ought, however, always to be associated with the avoidance of lost time by absence and probably its best expression lies in the reward taking the form of holiday with pay. For each month's perfect record a certain number of hours holiday with pay can be credited to the respective workers—and the accumulated credit

can be paid by a monetary allowance on the occasion of the annual **Punctuality.** holiday or on leaving, if this takes place before the holiday period. The question of sick leave affecting the holiday bonus can be met by special consideration of each case in the light of the year's experience.

In the case of juniors, the normal annual holiday could perhaps be extended by these "merit" holidays, thus emphasising the desirability of the reward to those who fail to reach the standard of attendance necessary to win such privileges.

These remarks as to a timekeeping bonus reflect actual practice to a certain degree, but are in part put forward only as suggestions.

V D

TIMEBOOKING

Job Records.

It is highly desirable to keep in mind, in considering the question of timebooking or booking of time to individual jobs, that the manner of making these job records is a potent factor in setting up an atmosphere of sustained endeavour. The indirect results of striving after accurate records may, therefore, be as valuable as the direct results, and conversely the harm done in accepting approximate records is not by any means limited to inaccuracy in the cost allocation.

The phrase "striving after accurate records" is used advisedly because perfect accuracy may be said to be quite impossible of attainment as a working proposition.

On the other hand, it is not uncommon to fall unconsciously into accepting gross inaccuracies, although high ideals are intended, and the indirect effects on production may be worse than if lesser ideals had been followed. Speaking generally, the maintenance of a high level of accuracy in job records is fraught with difficulties simply because human factors come into the question and human factors are notoriously shifting ones, and on different days give different results.

The controlling factors in connection with the routine for obtaining job records may be summed up as follows:

The method of informing the worker as to his next job.

The method of timebooking.

The method of certifying the work done, as to quantity and correctness.

The method of computing extra pay (piecework, premium, etc.).

It will be readily understood that in consequence of these variable factors the variation of method in use almost goes the length of there being different methods in every factory. The question is one calling for an intimate knowledge of the local conditions before a definite line can be taken.

Broadly speaking, it is desirable that the procedure adopted as **Job Records.**
to job records should provide for the following points : .. p. 364.

To notify the worker clearly as to description of work to be done and the order no.

To notify the worker as to the job rate (piecework or premium).

To provide for extra allowances on the job rate to meet adverse conditions outside the worker's control, e.g. bad material.

To record the time worked on each job accurately.

To provide a means for the passing on of work to the next operation, without loss of identification.

To provide for independent certification of the work done.

It is possible for a single job ticket accompanying the work to be made the vehicle of some of these functions at all operations, and this is not at all unusual. The disadvantage is that everything is staked on the undamaged existence of the job ticket from start to finish. Apart from occasional loss, job tickets that are used by the worker and others in the shops get soiled and become nearly illegible. These particular objections are only partially met by ^{F135.} having a carbon copy of each job ticket for office use.

There is the further point that circumstances may require work to pass from one operation to another before the whole batch or job on the earlier operation is completed. If these partial deliveries are only recorded on the job ticket, needless difficulty will arise if the job ticket gets lost, and there is the aspect of temptation being offered to the worker of fraudulently altering the certified entries. It is sounder in principle that any certificate of examination, on whatever form recorded, should pass direct from the examiner or viewer to the wages office. This statement is no reflection on workers generally, but simply means that it is wrong to offer opportunity for easy fraud lest one or two out of many should, by yielding, discredit the whole.

Job tickets can be utilised, and generally are used, when inspection or viewing between operations is carried out, as viewing certificates serving firstly as to the correctness of the work, and secondly as to the remuneration due.

In some shops it has been found to be an advantage for the viewing certificate to be separate from the job ticket. In one case the object is to give the worker a carbon copy as a receipt for his work, that he can produce if he does not agree to his pay, and in another case the object is for the carbon copy of the certificate, dealing with the complete operation, to be made also to serve as an instruction as to what is the next operation. This is an important

**Job
Records.**

step towards organising the regulation of work in progress, and is dealt with under that head on page 155.

So far as a receipt to the worker is concerned, it should be sufficient
F 98. if he is informed of rejections by a copy of the viewing report which in any case is desirable for dealing with rejections, apart from any viewing certification on a job ticket.

A point may be made as to printing a list of operations on the job ticket. This is a dubious practice as tending to slur the operations as to detail and to arrive at an indication only of the process. "Turning," for example, is really a process, and needs amplification such as "Rough turning flange" to indicate a specific operation.

From a costing point of view, the dissection of costs under processes may be sufficient, but the same cannot be said if such records are to constitute job data for production estimating purposes.

It will usually tend to clearer definition of the operation if no printed list is offered on the job tickets, except in such cases as moulding, coremaking, forging, etc., where no amplification can very well be asked for.

Sometimes instead of a job ticket for each operation, the work
F 100. tally is utilised for recording all the operations on one batch of parts—the work tally following the work through the shop.

There is another variety of ticket necessitated by the short duration of such operations as drilling, and this is merely a composite job ticket for the day's work. If suitably printed, such a ticket can afterwards be cut into strips for each job entered, thus forming separate job tickets. A serviceable compromise, in this connection, is to have a separate ticket each day for each order worked on. *This facilitates costing without entailing a multiplicity of tickets.*

Job records are so important for administrative purposes that timebooking should be controlled by a responsible man, preferably technical, under the works manager. A convenient plan can be for the wages office to include a wages allocation and production statistics section. This section can be responsible for building up
p. 77. F 28 the weekly time allocation sheets and wages allocation weekly
F 30 summaries. The extent to which this office will need to send clerks into the shops to collect information must depend on the system of timebooking used (see p. 350).

Timebooking should apply to both time work and piecework, or premium work. The extra earnings or extra pay over and above the time wages will follow the time allocation. Consistency on this point obviates difficulty when time work and piece or premium work is done by the same worker. Beyond that a time basis for
p. 364.
p. 462.

all work is usually necessary for applying production oncosts more accurately. Job Records.

There is little doubt that no method of abstracting job records for job data purposes from summaries, be they daily or weekly, can compare in usefulness, or even in accuracy, with having the initial record in unit form, that is, a separate record for each job.

The purpose of job records ought primarily to be the maintenance of efficiency in production by providing comparable data of performances. Their secondary purpose is usually to furnish cost data for works accounts purposes. These two purposes might be argued as identical, and the distinction lies wholly in the administrative use made of the data.

The wages office is concerned to make sure that the whole of each week's time is accounted for by the different job tickets, while the production estimating office is concerned to know that the records of time on the job tickets are exhaustive and comprise the whole of the time worked on the job, irrespective of the week. The interests of the costs office are to allocate or charge out to the proper cost allocation accounts the whole of the wages paid.

The different interests are best served when the job records can be released to the production estimating office all complete, after the wages office have built up a weekly time allocation sheet, which accounts for the whole time under consideration. These weekly time allocation sheets having served the wages office, more particularly as to the time booked, can be passed to the works accounts office for allocating the wages paid.

It is, however, more economical to work from separate job account cards, extending the wages cost on each and aggregating same for each order and summarising, preferably by mechanical means, instead of actually posting each detail item from a weekly wages allocation sheet for each worker. Fortnightly periods are very convenient for posting and summarising purposes, and give statistics as usable as weekly returns, with correspondingly less work.

The weekly time allocation sheet can be utilised as a basis for the analysis of the departmental expenditure on the various classes of orders—a matter of importance under some conditions. Such developments can, however, hardly be carried out with any economy and rapidity, except in conjunction with mechanical methods of listing and totalling.

The use of tabulating machines, as originally invented for census purposes, where a punched card becomes a mechanical record of a group of facts, alters the whole aspect of applying job records to the

**Job
Records.**

purposes of cost allocation, job data and production statistics generally. It opens up fascinating possibilities of readily obtainable statistics in a variety of forms.

**Timebooking
Methods.
p. 364.
p. 462.**

Timebooking is accomplished in various ways, of which the following is a fair summary :

Timebooking Method No. 1.

By the worker booking daily on a chalk board or on a daily F 27. time sheet or card.

This is indeed a rough approximation, varying according to the temperament of each man. The sheet or card invites more time being spent by each man in filling up, but there is quite enough scope for wasting time with the rougher chalk board. The foreman's countersigning of these records can hardly ever be more than formal, and workers have a way of seeing through formalities, so there is virtually no check on their statements. A worker's idea of time spent on a job, if timework, is a compromise between what it seemed like and what the job will "stand"—while if piecework or premium work is in question, independent confirmation is obviously essential.

Timebooking Method No. 2.

F 28 By a clerk taking down on a time sheet according to each worker's verbal statement each day.

This scheme is better than No. 1 in proportion to the ability and tact of the clerk. Given the right man and few enough workers to look after so as to allow not less than two visits to each worker daily, very fair results are obtainable, with the advantage of taking up very little of the worker's time. Still the worker's idea of the time of starting each job does come into this method and is not confirmed within close enough limits for the record to be used for piecework or premium payments.

Timebooking Method No 3.

By the foreman (or charge hand) booking each worker on a time F 28. sheet.

This arrangement looks as if it would make an excessive demand on the time of the foreman, but carried through in a proper spirit by a capable methodical man, who will school himself to making suitable notes immediately each worker changes his job, the scheme has something in its favour. The

record is independent of the workman and, given the right kind of foreman, could be quite satisfactory for computing piecework or premium work payments which means cutting out all other clerical work by the foreman on that score. Where a foreman is expected to formulate job rates this scheme affords a great deal of the requisite day to day education. Obviously the whole value of the records hinges on the integrity of the foreman, who has the power of adjustment so readily to his hand, and can hardly be detected, if careless in his booking. Further, he cannot deal with many workers properly or with jobs of very short duration.

Timebooking Method No 4.

By the worker booking on a job ticket for each job by writing down the times "ON" and "OFF." F 155.
F 156.

This pre-supposes a job ticket, presumably not made out by the worker, which is a condition common to the majority of modern systems. If the worker's booking is to be used for piecework or premium work payments then the foreman must confirm, which can only be satisfactorily done at the time. The trouble of getting the booking done at the time rather nullifies any advantage that can be credited to the scheme, in regard to relieving the foreman of any clerical work. It will be observed that this arrangement while providing for timebooking on the different jobs does not provide the equivalent of the time sheet referred to under methods Nos. 1, 2 and 3. The time sheet is essentially a weekly summary of each day's bookings or allocations for agreement with the wages paid.

Timebooking Method No. 5.

By the worker stamping the times "ON" and "OFF" on a job ticket for each job by means of a mechanical time recorder. p. 341.
F 155.

This goes far to meet the objection to method No. 4, but it will not do to suppose that stampings will never be made so as to favour either the finished or the new job. Further, it is not impossible to do a job right out while remaining booked "ON" another one. This, however, is in the hands of the foreman to control. Success really hinges on the foreman, and he is stimulated to the best results by knowing that the means are there for the worker to book accurately without his (the foreman's) presence at the moment of a job being finished. The accuracy is at the

**Timebooking
Methods.**

expense of a journey to the time recorder by each man at each change of job and is not quite right for short jobs.

If racks are provided at the time recorder for job tickets, relating to the "Next Job" as well as the "Job in Hand," the foreman has the means of planning the work of his men ahead so that the worker when stamping "OFF" the finished job ticket can stamp "ON" the new job ticket without referring to him on each occasion. The outstanding advantage of the use of the time recorder is that booking cannot be done after the event with any pretence to accuracy and the standard of promptness thus set up is very valuable in maintaining a general accuracy. Such records can accordingly be used for piecework or premium work payments with greater confidence. As with method No. 4 this scheme does not furnish a time sheet.

When a mechanical time recorder is used, it is more usual, if not universal, to have separate job tickets each week. This arises firstly, from the limitations of the time recorders in common use, and secondly, it is possible by having tickets for each job worked on in each week representing the whole of that week's time, neither more nor less, to utilise the week's group of cards for cost allocation purposes—dispersing them afterwards for job record purposes.

F 61.

It will follow from this that a job worked on in more than one pay week will involve a corresponding number of job tickets, which splits the record and burdens the file of records, unless each performance is abstracted. Obviously too, for every job in hand at the close of one pay week a continuation card must be written out for the succeeding week—quite a troublesome matter because falling due at the one moment throughout the works, although possibly anticipated in part.

Timebooking Method No. 6.

By the foreman (or charge hand) booking each worker on each change of job by issuing a new job ticket.

F 155.

This differs from No. 5 by reason of the workers not stamping their job tickets on the time recorder. The foreman might book the time by writing or might use a time recorder. The advantage over method No. 3 is in having a separate record for each job but there is the loss of the weekly time sheet.

If a time recorder is in use rather difficult conditions are set up for the foreman to meet, seeing that the time recorder is

necessarily a fixture. He is then apt to compromise between the shop difficulties and the office requirements with some sacrifice in accuracy. There is another aspect to be considered, namely, the finding of job tickets that have been already started on and interrupted. A job ticket rack (as referred to under method No. 5) for "Interrupted Jobs" will, however, meet the case.

Booking on to the job ticket by the foreman means he must be at his desk a great deal if the booking is to be done at all promptly.

One adaptation of this principle is in use in conjunction with the premium system of payment very much as follows :

Each job ticket has a counterfoil or detachable coupon, and is made out by the charge hand, who fills in the starting time and hands the complete ticket to the workman.

A ratefixer in the course of his perambulations of the shops to which he is attached duly comes round to the man, puts on a rate for the job and detaches the coupon on which he has noted his estimate. These coupons are passed in to the production estimating office to be matched up in due course with the completed job ticket, thus ensuring that every job ticket, and therefore all data of performances, reaches that office ultimately. The ratefixer's observation should check the general accuracy of the starting time booked on the ticket.

The job ticket is suitably printed on the back for the workman to enter up daily his time on the job. This method is obviously more suitable where jobs are of long duration. A shop clerk, under the direction of the works office, also calls on the man to note from his job ticket the time worked. These entries are made on a weekly time allocation sheet, and it is from these sheets the cost allocation is made.

Drillers and men on jobs of short duration have a daily card serving as a composite job ticket. The ratefixer fixes the rate for each job in just the same way.

In the case of labourers they fill in weekly cards approximating the time spent on different jobs.

Timebooking Method No. 7.

By the foreman making out a job advice slip at each change of job, giving the necessary particulars to the wages office.

The advantages in this method over No. 6 are that the foreman can write the job advice slips out anywhere in the shop, though in practice he may come back to his desk

**Timebooking
Methods.**
p. 366.

to do most of them, and what is rather important he is relieved of the necessity of finding job tickets relating to squad work and interrupted jobs. Incidentally, while a job advice slip must convey to the wages office, or may be the production estimating office, all the particulars necessary it has the appearance of being less trouble and certainly takes less time to make out a roughly written slip than a ticket suitable for office use and filing for reference.

Advice slips can be passed in skeleton form to a shop clerk to complete if the essential point as to time of starting be filled in by the foreman.

It is obvious that timebooking in relation to the start of one job gives the essential information as to leaving off the previous job. There might, of course, be a gap between two jobs, but if this were serious enough to be given recognition, the timebooking would then apply to the idle period as if it were a job.—(See notes under standing order S 6-6—unproductive or waiting time—on page 491)

Timebooking Method No. 8.

By a clerk booking on to job tickets from actual observation in lieu of the foreman or charge hand.

This is a scheme that can meet all requirements of accuracy and relieve both foremen and workmen of clerical work, and having only one distinct disadvantage, viz. the expense, unless on strictly repetition work where a large number of men can be dealt with by one clerk. This condition, moreover, not merely reduces the cost but the same clerk can report day by day any falling off in the quantity of work done by each man, and this might be his most important function.

Under these conditions the clerk becomes a worktaker, and the value of taking up particulars of time worked from this view-point is very far-reaching.

In all the timebooking methods described above, the record of
F 22. attendance is made independently—either by a time card or strip mechanically stamped on a time recorder or by the timekeeper's records based on a metal check system.

[I R—p. 63—Administrative Statistics.]

[V D—p. 346—Timebooking.]

V E

PRODUCTION STATISTICS

If production statistics are to give their maximum usefulness for internal administration purposes, they must reflect the individual performances of those engaged in production. Form of
Statistics.
p. 15.

In that sense they become firstly, a matter of statistics of individual output; secondly, of departmental output; thirdly, of the output of the work as a whole; and lastly, for interchange of information between the members of the respective trades.

Production statistics are defined on page 333 as statistics of output expressed in terms of time, numbers or plant employed.

From an internal administrative point of view it is not so necessary to go further and express output in terms of monetary value as is the case when information of this character is pooled for trade purposes.

Apart from the practice amongst combines of manufacturers of disclosing trade information to each other for fixing of selling prices, some development has taken place in the direction of production statistics being disclosed to the members of Joint Industrial Council in some trades. p. 182.

In both the latter sets of circumstances, the figures disclosed are necessarily averages, and are not in the form applicable to administrative purposes.

Some consideration to the form and application of administrative statistics generally is given on page 63 *et seq.*

The question of individual output is really synonymous in very large measure with that of production estimating and ratifying, to a consideration of which Section II D is entirely devoted. Individual
Statistics.
p. 117.
p. 346.

Much valuable information as to output exists in most works, although, unfortunately, in many cases it is put to no practical use.

In any works where the product manufactured has any pretensions to being repetition work, records of some kind are made as to time

Individual Statistics.

spent in relation to work done and, even where there is no specialist on the staff acting as production estimator, these records may, rightly used, be made to wield a very valuable influence towards not only maintaining but increasing production.

This influence can be more valuable perhaps where the system of remuneration is that of time work only, there being no incentive otherwise toward good production, and the rate of production, when allowed to go unnoticed, can fall away to an alarming extent.

Dependent on the nature of the work and, to a degree, to the existing standard of output, the actual time in which specific operations have been done should be noted, and compared. Small differences in the amount of production must be expected and F 62. accepted, but any large difference in this direction justifies enquiry. Judiciously made and carried right through until the real reason has been unearthed, these enquiries can produce a wealth of information which will enable weak places to be strengthened and a moral influence to be wielded with good results on all concerned.

Inefficient production may be caused in various ways, and among these may be mentioned :

Shortage of work.
Machines out of repair.
Tools out of repair.
Loss of right tools.
Jig requires overhauling.
Jig difficult to use.
Faulty work through unobserved wear in tools.

On the other hand, performances of exceptional merit can be recorded, a simple notification to the foreman to pass on to the worker, indicating that good output has been noted, doing real good.

Under a timework system, where circumstances otherwise justify it, a practical recognition, in the shape of an individual advance in wages for continued excellence, has a great value and tends to offset any prejudice against the use of such comparisons when the output is so low as to justify reproof. In fact, these statistics can be made a criterion as to whether an advance in wages is justified or not.

p. 360. The principle advocated of dealing with extra pay separately
p. 463. F 19. from time wages makes it possible to keep the record of individual earnings requisite for income tax return purposes, under the separate heads. From this record a very good idea of individual efficiency can be obtained by observing the ratio of extra pay to time wages for, say, each three months when the income tax returns are made up. This use of these statistics can be safe only if the fixing of

job rates is consistent so that the extra pay earned is in all cases in direct proportion to the extra skill and effort expended.

The question generally of job records is discussed on page 346 *et seq.* and comparison of job records furnishes practically a measure of individual efficiency taken job by job rather than of week by week.

In proceeding to the further stage of statistics of departmental output, other questions come in that are not of equal interest in connection with individual output, viz. : departmental auxiliary expenses and the question of oncosts generally.

Departmental statistics, under heads such as the following, may have high administrative value :

Percentage Rates of total Extra Pay.	{	to Total Time Wages
		1. Of piece or premium workers.
Percentage Ratio of unskilled workers.	{	to Total Working
Percentage Ratio of supervision		1. According to numbers.
Percentage Ratio of inspection.		2. According to wages paid.

Horse-power used per worker employed.

Selling value of output in relation to capital employed.

Cost of errors and defects according to departmental responsibility.

Information as to total number working during any particular period can be obtained from a suitable lost time summary wherein F 150 adjustment of the total number employed is made in regard to all absentees as noted day by day.

There is suggestion for departmental statistics generally in the recommendations put forward on page 518 relative to a foundry, viz. :

Percentage Ratio of weight of metal melted to weight of product.

Percentage ratio of weight of wasters to weight of product.

Percentage ratio of fuel weight to product weight.

Average fuel cost per unit of product weight.

Percentage of metal loss on basis of metal costs.

" " " " " of product weight.

Average metal cost of product per unit of weight.

Average direct wages cost of product per unit of weight.

Average total cost of product per unit of weight.

Average number of product items per ton of product.

(All product weight taken as the net weight delivered to Stores.)

Failing more precise methods of measuring output in terms of actual possible capacity of the plant, a valuable indication can be obtained by comparison of present with past output, which, totalled and analysed, would be most helpful in deciding need for overtime, night shift, etc.

The discussion in Section I F under the heading of Administrative Statistics and the charts on page 68 are all germane to this subject of departmental statistics.

**Departmental
Statistics.**
p. 237.

The references to Collective Output Bonus on page 135 and the discussions in Section III E—Principles of Remuneration, also have application to the present discussion.

**Works
Statistics.**

Production statistics of the works as a whole may be derived by aggregation of the departmental statistics in some cases, but ordinarily the works product as sold is the outcome and climax of a progression of departmental efforts so that a new basis of statistical comparison is called for.

It is not unknown for weight to be used as a measure of output for departmental work and also for the work product as sold. Such a measure is undesirably crude where machine work is involved and can only be justified in any circumstances either by averaging over long periods, or because of the evenness in the character of output, such as mass production of a single type of machinery or uniform form of product, as coal, steel, etc.

Quantity or volume of output is used oftentimes when weights are obviously inapplicable, but unless the product continues to follow very closely an even line, then quantities can be as misleading as weight.

The adoption of an appropriate unit of product is vital to the whole issue of production statistics, and the best solution is likely to lie along the lines of deriving the unit from the staple product, or a product that is important enough to serve for this purpose, and then to convert all variations from the staple product into terms of the latter. The constants adopted for this purpose may not be mathematically correct, but if reasonable judgment and care is used in determining the constants in the first instance, relatively little error will result in the statistics taken as a whole.

It should preferably be a matter for the production estimator to investigate the normal difference in production costs of what may be called special product, as compared with the staple product adopted as the standard, and by expressing the difference as a percentage of the standard unit, either above or below, the required constant is derived for converting the special product into terms of staple product.

It is in this direction that the crux lies of reaching any uniformity of either production statistics or production cost in any given trade.

**Trade
Statistics.**

Before statistics can have the least value for comparison as between firm and firm there must be a most precise standardisation of method in building up the statistics. This standardisation has yet to be reached in nearly all trades, and while there may be easily

observable factors common throughout a given trade, the formula-
tion of a standard basis for statistical purposes, particularly as to
the unit of product, can only come by agreement amongst the
majority of the manufacturers engaged in any given trade, and the
general basis, when found, will have to be adapted to the various
branches of the trade.

Trade
Statistics.

[III G—p. 251—Works Regulations, Payment by Results.]
[III G—p. 253—Works Regulations, Payment of Wages.]
[VI E—p. 462—Wages Allocation.]

V F

WAGES

Preparation of Wages Sheets.

SPEAKING broadly, wages are made up of time wages and extra pay. Time wages are the wages earned virtually by attendance, it being a separate issue for the employer to get value for the wages so paid. A system of extra pay, whether individual or collective, may be said to ensure that adequate value is given, though the broader principle of mutual interest should be the motive behind the administration of these systems.

p. 340. Timekeeping, as already discussed, is necessary for computing time wages and timebooking, in conjunction with the amount of work correctly performed, for computing extra pay, and, of course, for costing purposes.

F 31. It may be assumed that the wages sheets will be made up from
F 22. the time cards as to the total hours worked and overtime allowances due, and that the totals of the extra pay earned will be derived
F 26. from the job account cards. These cards may be no more
F 155. than job tickets made to serve this further purpose by suitable ruling.

There may be questions of special allowances in some industries, e.g. for boiler trials, and these may be recorded in a separate book marked "special allowances," for convenience of obtaining authority each week from the works manager.

p. 253. Deductions of a regular character such as national insurance and
p. 258. hospital contributions can be dealt with entirely on the wages
p. 367. sheets, except as to a reference list stating the regular amounts

F 19. and this may be arranged for on the workers' rate sheets.

p. 198. Deductions of the nature of fines will require to be recorded in a fines book for reference and authorization by the works manager and to meet Home Office requirements.

The completed time card when issued on pay day as a pay card, may conveniently be made to serve as a notification in writing to the man concerned as to any fines incurred. The works manager will be well advised to utilise the services of the labour co-ordination

p. 189.

officer to inform the offender beforehand. In any case fines are a most undesirable channel for exercising discipline. Preparation
of Wages
Sheets.

The time card need only be completed as to total hours for which payment is made, that is, hours worked plus overtime allowances, so as not to disclose rates of pay when the cards are issued for pay purposes. Exceptional deductions would be noted but no note of regular deductions is necessary. Particulars of extra pay included in pay envelope can be conveyed by an enclosed slip.

F 29.

In the making up of the wages sheets, the preparation of the sheets as to names and rates may be undertaken early in the week by copying from the preceding week's sheets. This is one of the advantages to be derived from having loose sheets that may be bound up after preparation, though not finally until completed and checked.

The difficulty of including new workers is got over by placing their names at the end of the list on the first occasion and sorting the pay envelopes in question into their proper order after making up. The names will take up their proper sequence according to check numbers in the following week.

The wages of workers leaving during the week should be made up on a separate sheet and similarly for any workers paid before the usual day. Their wages should not be included in the ordinary wages list or pay roll, which is thus confined to those workers who have to be paid at the regular time. It may be convenient, however, that their check numbers should appear in the ordinary list, but without any amounts against them.

The machines on the market for addressing envelopes and listing generally can be adopted for wages sheets—the stencil method being perhaps more convenient and cheaper than type or embossed plates.

Departmental totals and inclusive works totals of wages are obtained by summarising the total of the respective wages sheets on the last sheet for the department, and the departmental totals on to a wages abstract. The advantage of this course is to restrict the disturbing effect of any alteration found necessary to the single sheet totals concerned and to facilitate arriving at section totals for pay purposes. F 32.

It is imperative that the wages sheets should be very carefully checked, and to this end it is not uncommon for the time cards to be separately extended and then called back with the wages sheet. Alternatively, it is feasible to do this extension on the pay envelopes. To do this will mean noting the rate per hour on the pay envelope, and in view of the extra pay items to be added to the time wages and the national insurance and other deductions made from the total, it will be better generally to concentrate all

**Preparation
of Wages
Sheets.**

the checking on the wages sheets. The fact that removable sheets are in question allows the checking to be proceeded with by several clerks simultaneously, if necessary.

- F 33. Pay envelopes giving the actual wages due are of much assistance in making up the pay. These pay envelopes can be arranged in bundles corresponding to the entries on each wages sheet.

If a pay tin is used instead of an envelope, then a pay slip is necessary for placing in the tin. With paper money in use the envelope is to be preferred in every way, despite the cost.

At the end of the wages sheets for each pay section, a rubber stamp endorsement on the following lines should be made and the requisite certifying signatures given :

Wages Sheets Made up.	Wages Sheets Checked.	Insurance Cards to date.		Wages Paid out by
		Stamped	Verified.	

p. 367.

The necessity for verification of the insurance stamping each week has become increased by the health cards being for six months, and the wider application of unemployment insurance. In any case, the values at stake demand every safeguard against misappropriation, and the requirements of the Act can only be met by the utmost care.

A point may be mentioned as to computing wages figures to the nearest halfpenny. With the advent of the National Insurance Act halfpennies cannot be altogether avoided in the wages totals, and that being so, it is reasonable to compute the time wages accordingly, though hardly the extra pay. Subject to the provision of ready reckoners, now on sale, there is an all-round advantage in expressing hourly rates in terms of the decimalised shilling.

p. 552

**Payment of
Wages.**
p. 76.
p. 253.

The cash analysis should correspond with the pay sections, so that each section can be agreed in making up the money before proceeding to the next section. Obviously errors will then be more quickly found than waiting till every worker's pay is made up before discovering that the money works out wrongly.

The cash analysis should be carried to the extent of indicating the number of one pound notes, ten shilling notes, half-crowns, threepenny pieces, copper and sundry silver. This analysis of cash required is quite simple and if thought desirable the actual sorting of the silver from the bank may be done automatically by a silver sorter. The use of a silver sorter necessitates drawing the

silver in guaranteed bags of say £50 from the bank, but this is not a prohibitive condition. The difficulty with unguaranteed £5 bags is that the particular bag in which an error occurs must be returned to the bank with a claim, and to automatically sort silver in £5 lots for this purpose is too troublesome in respect to taking out the sorted coins. Payment of Wages.

The pay for two pay stations may be advantageously made up at the one table, and to this end two pay clerks will work together.

The cash for a given pay section being placed on the pay board the corresponding pay envelopes will be placed in a row on edge. Pay Clerk No. 1 will select the cash and pass it over with the respective envelope to Pay Clerk No. 2, who will check and put it inside the pay envelope. This routine obviates the risk of figures being read against the wrong check number, and makes for rapidity. Pay Clerk No. 2 by his checking accepts responsibility for these pay envelopes, and puts them in trays for locking up until pay time, when the pay boxes will be carried to the pay stations—the responsible pay clerk being in attendance during the transfer. F 33.

The pay clerks will change duties in making up when the pay for one station has been got ready.

Any competent clerk who has no responsibility for computing the wages figures may serve as a pay clerk. A small bonus of, say, one shilling for each pay correctly made up against which mistakes can be set will give an interest and efficiency to what is a somewhat unwelcome responsibility.

In offering the above outline of pay routine it is assumed that away time and away expenses will be made up separately on a special pay ticket. F 37.
F 36.
F 35.

Accident compensation should also be paid separately as a petty cash disbursement.

It is supposed that there will be two clerks in attendance at each pay station—one, the pay clerk, handing out the money and the other receiving the pay cards and cancelling them by a crayon mark across the corner. F 22.

Pay cards cancelled by payment at any other time can be punched or clipped to obviate any confusion with unpaid cards.

Pay cards can be placed with the current time cards in the recorder racks during the meal-time immediately preceding pay time—that is, at dinner time when pay is made Friday night.

It is better generally to pay on Friday night rather than Saturday morning, in the domestic interests of the workers and also to avoid the total dislocation of office routine during practically the whole Saturday morning. When pay is made Friday nights the pay clerks have the full morning clear of interruption for their ordinary work,

**Payment of
Wages.**

and Saturday morning becomes in turn more useful than the lost Friday afternoon. This is particularly so when the pay arrangements are well organised and the time of making up reduced to a minimum.

F 34 After the pay is over, the pay clerk, before handing in any unclaimed wages, will enter the items on an unclaimed pay report, keeping a carbon copy of same. This note will be handed in to the cashier with the money and the total signed for. The note will be suitably filed. Claims afterwards will involve the pay card being obtained from the wages office and handed in to the cashier as a voucher, the necessary receipt being given on the respective unclaimed pay report.

The pay envelopes should be emptied and the cash paid into the bank after two pay days have passed without a claim being made. Unclaimed pay cards are then made out for each such case and held as an authority to pay when the rightful owner claims the pay. In fairness, if the postal address of the workers concerned is not known, a notice should be put up, at this stage, on the works notice board, giving the names and check nos. of workers for whom money is held waiting claim. If the worker has left some friend will get the news to him.

Other points in the pay routine will be sufficiently suggested by the specimen works regulations dealing with payment of wages, given on page 253.

**Extra Pay
Computation.**
p. 257.
p. 346.

The application of job records, necessary to any system of extra pay, to the further purposes of timebooking, are quite important, on the score of both economy and accuracy, and are accordingly discussed at some length in Section V D.

Taking all factors into consideration and assuming freedom to co-ordinate the method of production regulation and examination of work with the job ticket requirements for computing extra pay, the system likely to afford the best results may be sketched out as follows.

If separate delivery or progress tickets are used for passing work from one section to another, these tickets can be used for certifying the results of the completed operation to the wages office and another progress ticket made out at the same time for accompanying the work to its next stage. This particular routine is illustrated diagrammatically on page 153.

When a job is put in hand for a particular operation a job advice slip can be made out by the section hand and sent to the production estimating or rate-fixing department for confirming the job rate and enabling that department to inform the wages office accordingly.

The production estimator would, through his clerk, prepare a job account card for use by the wages office in making up the extra pay account. If this job account card is provided with a counterfoil, say at the top, for noting the official job rate—this counterfoil can be detached and sent to the shop foreman for issue to the worker or be delivered direct. This routine meets the requirement of the latest trade union agreement in the Engineering Trades—see page 211.

Extra Pay
Computation.
F 26.

If again this job account card is provided with a second counterfoil, say, at the bottom, the wages office after completing the extra pay calculations can note the result on this counterfoil and arrange for same to go in the worker's envelope.

Should it happen during the course of the job that some extra allowance is considered justified by the section hand or foreman, he can use another job advice slip to ask the production estimator to look into the matter and this slip will be passed on to the wages office when the extra allowance, if any, has been agreed.

p. 121.

The same job advice slip that notifies the commencement of a new job will serve to notify the completion or interruption of the job until then in hand.

For jobs of short duration a daily time slip will be necessary F 27. or a separate job ticket of that character for each production order concerned.

It will be easily appreciated that every worker working under F 28. p. 354. this system will have his time automatically booked up for the whole week in the wages office without a clerk visiting the workers. It will again be very easy to utilise the progress tickets for informing the production office of jobs completed. All that is necessary to free the progress ticket for this purpose is for the wages office to transfer the certified totals of work accepted to the respective job account cards and have same checked and initialled. The progress ticket can be just filed in card index fashion in the production office under the order no. and part no. or other references.

The question also arises of conveying to the worker the results of viewing, if this is held to be necessary. The point would seem to be met well enough by advising the worker of rejections, which is desirable in any case, by means of a copy of the viewing report.

F 98.

The routine indicated above will be proportionately simplified under mass production conditions with job rates standardised and known. The job advice slips could be used to confirm at the beginning of the week the operation in hand and, if no batch costs are attempted, would hold good for the whole week unless the worker was changed

**Extra Pay
Computation**

on to another component. These slips would go direct to the wages office and there would be only one job account card for the whole week—requiring only one counterfoil, viz., that for placing in the pay envelope.

So far as these arrangements necessitate a volume of loose slips, criticism must take into account the greater flexibility and freedom of action for all concerned that results therefrom. A very little organisation in the collection and distribution of the slips will eliminate practically all expense on that account and obviate losses.

p. 47.

Where workers are in fellowship, that is, associated under one job rate, the basis of division of the total extra pay is either according to the number of hours worked or the bare time wages for those hours, dependent on whether the premium or piecework system is being worked.

The extra pay accounting for these conditions becomes a little more elaborate than for individual jobs, but only a little. On a group work card a space is provided for each worker's name and entry made of the time worked—these times are aggregated on the completion of the job. The total time taken, or the total wages for the time taken is compared with the job rate and the total extra pay arrived at. This is then expressed as a percentage ratio of the total time taken, or total time wages, and this percentage is then applied to each worker's time, thus sharing the extra pay accurately and readily. Calculating machines are of particular value in this work.

p. 447.

p. 252.

p. 463.

In computing individual extra pay it is a distinct advantage for payment to be made the week following completion of job. This enables the viewing to be carried out more efficiently, and allows a much better arrangement of the wages office work, the staff being able to concentrate on the extra pay work for the first half of the week and on the ordinary wages the latter part of the week.

Where a worker receives extra pay in any week for a number of jobs a summary is necessary for bringing the items together for wages sheet purposes.

p. 29

p. 234.

In the case of a collective bonus system, if the bonus is computed as a rate per shift worked—see example of works regulation, " Bonus System for Time Workers " (page 252)—the time allocation records will furnish the number of shifts for each worker. The extension at the proper bonus rate per shift can be arranged for on the wages sheets and this only means posting the number of shifts for each time worker affected. It will be found very convenient to pay this bonus fortnightly, so as to allow time for collecting and applying the statistics necessary for determining the various departmental bonus rates.

The original National Insurance Act (1911) is divided into two sections, the first part dealing with Health Insurance and the second part with Unemployment Insurance.

National
Insurance.
p. 253.
p. 380.

Where there is any doubt as to the correct interpretation of any clause of this Act and its several amendments, employers will usually find that the visiting Inspectors under the Act are very willing to help them.

Health Insurance (Part I.).

Compulsory Health Insurance concerns at the present time almost all persons engaged in manual labour between the ages of sixteen years and sixty-five and in receipt of less than £250 per annum [additional Act 1919].

All insured persons must obtain a health insurance contribution card from their approved society or from the post office, and their employers can demand the production of it at any reasonable time. As these cards are not issued to employers as a rule, employees should be made to realise that they are responsible for supplying their employers with same. Emergency Cards may be used in exceptional circumstances, but one stamp only should be affixed to any one of these.

All stamps attached to Emergency Cards should be cancelled by writing in ink across the face of the stamp the date on which it was affixed to the card and also the name of the person for whom the contribution has been paid. It is advisable in all cases to avoid as much as possible the frequent use of Emergency Cards.

Emergency Cards are apt to be mislaid or dealt with as though they were not of any importance, and consequently a good deal of trouble and extra work can be caused at the end of the insurance year or half-year as the case may be. Moreover, Emergency Cards as soon as they are stamped ought to be handed to the employee, and it is very inconvenient to be continually distributing Health Insurance Cards among the workers from whom the proper cards have not been received.

An amendment to the Act of 1911, dated January, 1914, gives employers permission to stamp their employees cards the week following that in which the wages are paid. It is desirable, however, where wages are paid weekly to commence stamping the cards as early as possible each week.

In cancelling stamps affixed to contribution cards there are certain rules that must be carefully carried out. With the ordinary card it is not at all necessary to write the worker's name across the stamp; but only to cancel it by marking the date either in ink or stamping with a metallic dating stamp with black indelible

**National
Insurance.**

ink or other similar composition. Aniline inks may not be used when stamps are cancelled with a metallic die nor may rubber stamps be used.

When the employment ceases the card must be handed back to the employee immediately, full details of the card as to reference no. and number of stamps being previously taken by the employer and a receipt also obtained for the card.

Signatures should also be taken for cards returned to employees when the period of currency has terminated.

Where it has been mutually arranged that the employer should have the custody of the Insurance Cards, they must be returned to the employee at the expiration of the period of currency or within six days after. If, for any reason whatsoever, the employer should find that it is impossible for him to return by hand or post the card to the employee, he must send it to the Insurance Commission.

On the death of a worker whose card is in the custody of the employer, the card should be sent accompanied by a covering letter direct to the Insurance Commission.

Where an employer definitely undertakes to pay an employee full wages during sickness, for six weeks in any one year, he may pay his contributions at a reduced rate and in such cases the sick person does not receive any benefit under the Act until such time has elapsed.

There are certain workers who are excluded from compulsory health insurance. Employers should ask to see the worker's certificate of exemption as any person whose claim to exemption is sanctioned by the Commission is supplied with a certificate to the effect that he is exempt from paying contributions.

Exemption Insurance Cards are not obtainable at the post office, but are supplied direct from the Commissioners and are issued to exempt persons only. In the case of exemption cards the same procedure can be pursued as with the ordinary cards, although employers must be particularly careful to see that exemption stamps only are used for the cards. The value of an exemption stamp is paid entirely by the employer, and must not be deducted from the earnings of the employee.

Unemployment Insurance (Part II.).

So far as the general rules and regulations are concerned, there is very little difference between Part I. and Part II. of the Act. Compulsory unemployment insurance was originally restricted to a relatively few trades, but is in process of wide extension.

Unemployment cards can only be obtained from the various

employment exchanges and no worker should be engaged in an insurable trade unless he hands in his Unemployment Book or gives in an official card informing his employers at which Employment Exchange his book is lodged. *This card is known as U.I. 40, and should immediately be sent to the Employment Exchange named thereon, and the Unemployment Book belonging to the worker will then be sent direct to the employer. Employers must take care to state accurately on the card U.I. 40 the date on which the worker was engaged and his full name and address.*

National
Insurance.

Where a worker is engaged in an insured trade who has not been engaged in an insured trade previously, he must personally call at the nearest Employment Exchange and there fill in a form of application for an Unemployment Book. This form will then be sent to the Head Office for Unemployment Insurance, and meanwhile the worker will usually be supplied with a temporary card which must be handed to the employer and duly stamped each week. When the permanent or proper Unemployment Book is received, the temporary card should be returned to the Employment Exchange, whence it was issued, and the reference number of the proper Unemployment Book as received should in every case be quoted.

If the permanent book is not received in time, the employer should affix any stamps due to an Emergency Card which should not at any time be handed to the employee but sent to the Employment Exchange.

Under section 94 of the original Act, it is possible for employers to obtain a refund out of the unemployment fund of a sum equal to one-third of the contributions paid by him on his own behalf for any employee who has been in his employ for twelve months, and for whom 45 contributions have been paid during the insurance year.

All applications should be made on the printed official forms obtainable from the local Employment Exchange, which should be rendered in duplicate giving the following particulars :

The workman's surname in full and the initials of his other names.

The number of the workman's Unemployment Book.

The letters on the workman's Unemployment Book indicating the Division to which it belongs.

The number and denomination of all unemployment stamps affixed during the insurance year by the employer to the workman's Unemployment Book.

Forms for this refund must be completed within two months from the end of the insurance year. So far as Unemployment

**National
Insurance.**

Insurance is concerned, the insurance year is the period not exceeding 53 weeks which ends on the Saturday nearest to the 14th July. It will be very helpful to have an independent record, apart from the wages sheets, of all deductions for insurance. By having this record, it can be seen at once for which employees rebate can be claimed.

Custody of Insurance Cards

All Insurance Cards should be kept under lock and key and in fireproof safes or boxes.

Only those persons immediately concerned and interested in the insurance work of any factory should be allowed to have access either to insurance cards or insurance stamps. It is also advisable that all stamps should be placed in a secure and fireproof compartment whenever they are not being used.

As Health Insurance Cards are the same size as Unemployment Books, it will be found to be convenient if they are placed inside the Unemployment Books of each employee. This practice will help considerably when stamping the cards each week, as both cards can be stamped simultaneously.

Great care should always be taken in seeing that the correct books are stamped, and to avoid any error in this direction it is desirable to go through each pay roll or wages sheet and place on one side any cards that do not require to be stamped owing to the absence of the worker.

Cards should at all times be kept in departmental and numerical order of check number and where it is the recognised method to place on one side any books or cards that do not require stamping, errors ought not to occur, particularly where the correct number of stamps of each denomination is handed to the clerk who is doing the actual stamping. It will be found to be an unwise procedure to issue any surplus supply of stamps.

V G

STOCK ACCOUNTS

STOCK accounts may be considered either as administrative records or as a phase of cost accounting. Stock control as discussed under Stores Organisation in Section IV c could be argued as affording a sufficient record for administrative purposes, but stock control, as there considered, stops short of money values ; without money values administration cannot be exercised with an adequate sense of proportion, which is vital if administrative effort is not to be frittered away as it can so easily be.

Functions of
Stock
Accounts.

The function of the stock accounts is affected by their relation to the stores organisation generally.

They serve two purposes, on the one hand to give consumptions and the balance of stock to be accounted for by the stores, and on the other to prove that the value of materials charged in the cost accounts, as having been consumed, agrees properly with the issues of material shown in the stock accounts—in other words, that all material issued, that is consumed, is allocated in the cost accounts. Otherwise the book values of stock would fail to satisfy the financial books as to materials received by the works and unaccounted for by the cost returns. At the same time the cost returns would be inaccurate.

p. 568.

As the quantities as well as values of goods received and issued are necessarily recorded to provide intelligible stock accounts, it is not unusual for stock control to be attempted through the stock accounts.

The objections to combining these functions in the one system of records are threefold.

- (1) Stock control records require to be in the hands of the man controlling the stock.

As argued elsewhere, this may mean that the control records as to component stock, considered as reserve stock, should be centred in the works office.

p. 154

Functions of
Stock
Accounts.

F 89.

So far as the storekeeper controls the stock, and normally he controls it all, he will need the requisite records ready to his hands all the time, so that it is hardly feasible that money values should be entered in the same set of records, without at least taking the whole of the stock account work away from the works accounts office.

- (2) For efficient stock control the records of receipts and issues should be kept posted close up to time all day and every day.

This condition alone rules out money values on these records because invoices may not be to hand before the goods are issued, and, if they are, the rating of the issues means delay, which must be avoided. It would be possible, no doubt, to do this work, but this would not eliminate the objections mentioned above.

- (3) The subdivision of records necessary for stock control purposes means practically a separate record for each size and each variety of each kind of article kept in stock.

This itemised division would be too cumbersome if money values were in question, not because of any difficulty in making the necessary entries, but because of the multitude of totals to be collected each account period if agreement between the stock accounts and cost allocation accounts is to be proved.

Accuracy in
Stock
Accounts.

The primary conditions requisite for accuracy in the stock accounts are twofold.

Correct identification of the goods received.

Correct identification of the goods issued.

There are, in addition, related questions of accuracy in rating the stock issues, and accuracy in the cost allocation of same.

p. 379.

The rating of issues is more commonly known as pricing. "Rating" is preferred merely to keep the use of the term pricing exclusively for actual trading prices, either buying or selling. The

F 124

F 128.

rate adopted may be by reason of averaging or allowance for wastage or something different from the purchase price. In the case of components manufactured in the works the rate used for stock accounts purposes will be quite distinct from any purchase or sale price, and this emphasises the desirability of avoiding the term price in stock and cost accounts.

To obtain correct definition or identification, of goods received and issued, with ease and certainty means having a common basis of reference by both the stores and the works accounts office.

The practice of identifying consignments of all goods received by labelling with the goods received no. (G.R. no.), provides in itself a perfect system of identification, so long as the different consignments can be kept distinct while in the stores. Obviously this scheme implies the quoting of the G.R. no. on the respective goods issue vouchers. Such a routine is advocated in the case of special purchases of goods that do not pass through the stock accounts proper.

Accuracy in
Stock
Accounts.
F 82.

F 85. p. 298.

F 86.

Much as the scheme of continuously identifying each consignment of goods is to be commended in principle, there will be too many difficulties in the way for it to be applied to all classes of stock.

For those reasons more general arrangements for identification are necessary, and these have been indicated in the specimen classification of typical items of general stock given on p. 290 *et seq.*

When formulating a suitable system of stock accounts to suit a given works, arrangements are necessary to ensure the proper carrying out of that system.

Stock
Checking or
Scrutiny.

This checking of the stock accounts or stock scrutiny, as it may be better called, can be carried out so thoroughly as to cost too much. On the other hand, stock accounts cannot be relied on that are not subject to some regular scrutiny.

p. 384
p. 385.
p. 392.

Stock auditing is a term sometimes used in this connection, but it is inadvisable to use the term auditing in other than its orthodox financial sense. Stock scrutiny, in the sense used here, is more than a check of book-keeping accuracy.

Stocktaking once a year is the usual check on stock accounts, but only incidentally then, because actual counting and weighing of stock is necessary, under average conditions, to provide the management with the data for issuing a certificate of the true total values of stock.

p. 386.
p. 373.

The annual stocktaking may be claimed as stock scrutiny on the grand scale, in fact, on too large a scale for all the differences disclosed, between the stock as taken and the stock according to the stock accounts, to be investigated.

Flagrant errors will be noted and adjusted too long after their occurrence to prevent repetition, and generally speaking, the annual stocktaking is an altogether unsatisfactory substitute for proper scrutiny throughout the year.

The best compromise in this matter is to establish the practice of an assistant from the works accounts office making a visit of inspection, possibly at stated times, say twice a week. The programme for each visit should be drawn up by the works accountant, but

**Stock
Checking or
Scrutiny .**

no notice of the programme should be given to the storekeeper. An elaborate programme is not necessary, as the necessary disciplinary effect can be achieved by dealing with a few items, while the interference with the stores routine is proportionately less.

Shortages, both actual losses by dishonesty and apparent losses by reason of failure to obtain proper vouchers before issuing, will be found to occur mostly with articles of general utility, such as soaps, candles, brushes, etc.

Proved inaccuracies in stock balances must be strictly dealt with, not so much for the particular values that may be in question, but, because, for every inaccuracy proved, there are certain to be others that are unproved. A stock balance in excess of the stock account balance implies inaccuracy as much as a shortage does, and carelessness should not be condoned because there seems to be no question of missing stock. Discretion will be necessary as to what differences are permissible in the case of goods issued in small quantities from bulk, such as bars.

Stock scrutiny involves testing the actual stock balance against the stock account balance and may be extended at the works manager's discretion to include a criticism of the rate of consumption, especially auxiliary supplies.

p 383.

The work of stock scrutiny may be facilitated by first testing the actual stock against the stock control records, and then as a separate stage to test the stock accounts against the stock control records after expressing the balance shown on the latter in terms of value.

F 123. This point is dealt with again in connection with the agreement of F 125, the stock ledger.

**Special
Purchases.**

It may be assumed that there will always be a certain number of special purchases made of goods for particular orders that can hardly be said to pass into stock when received.

When these special purchases are in question, it may be better not to consider such items as even temporarily in stock, lest the stock accounts be left with surpluses of special material at cost price instead of scrap price.

As, however, the stores receive the goods in question, there should be some routine established by which the issue of the goods is demonstrated and the allocation confirmed. This may be done

F 86. by requiring a goods issue voucher to be furnished by the department to whom the goods are issued.

These vouchers will be lodged with the works accounts office, and attached there to the respective goods received notes. These notes and vouchers can thus be made to serve as individual stock

accounts for each consignment. Any surplus material that is **Special Purchases.** not issued must come under review before the records can be cleared.

These vouchers can be made out by the stores, and sent as an advice to the department interested, the foreman of which will sign the voucher when requiring to draw the goods. Against this routine may be set the undesirability of the foreman ever drawing the whole of a special consignment unless the whole has to be worked upon forthwith. It may be easier for the stores to be finished with the responsibility at once, but neither this nor accounting convenience should force materials into the shop before the proper time, or in larger quantities than convenient for production.

There is a further point in this connection, namely, that in purchasing special material it will often be important to allow a margin for wastage. This margin ought, in principle, to be held in the stores pending the necessity for drawing upon it. The accounting method offered will allow all these points being met.

The question of the oversight of the respective sub-stores largely **Sub Stores.** settles the stock accounting routine necessary. **p. 302.**

If the head storekeeper is qualified and in a position to supervise the sub-stores, it will be possible to ignore the sub-stores in the stock accounts, and to keep single accounts, as if the stock were all located in the general stores.

The advantage of this course lies in eliminating from the stock accounts all entries of the transfers between the general stores and the sub-stores.

In the case of a sub-store under a departmental foreman, separate stock accounts will be necessary for the various articles held.

The accounting requirements necessary when transferring goods from the general stores to a departmental stores having separate stock accounts, can be met by the use of a goods issue voucher **F 86.** suitably endorsed. These transfers will be dealt with in the stock accounts by a credit entry (in red ink) in the "receipts" column of the one account and a corresponding debit entry under "receipts" in the account benefiting by the transfer of stock.

Recommendation is made elsewhere as to utilising the tool stores as a sub-stores for distributing departmental sundries. When this plan is adopted, it will be more convenient to allocate the transfers, as they are made, to the respective departmental account—apportioning by estimate, if need be, when more than one department is served. No serious error in cost allocation need arise by this practice, and much clerical labour will be saved. As already pointed out, substantial economies in the consumption of sundries are likely

p. 303.

Sub-Stores. to arise from this course, amply justifying the approximations made as to allocation. Departmental sundries may possibly be drawn from the tool stores by means of written slips after the style of F 91. tool loan slips. When, say, a sales repair order is to be charged with supplies of this character, the slip can be marked accordingly and passed to the works accounts office, who will credit the departmental sundries account and debit the sales repair order account.

p. 305. Fuel stock should be the subject of a departmental stock account, and its consumption reported by the person responsible for the power efficiency generally. Stock scrutiny will have to be by rough estimate of stocks, but should not be neglected on that account. On the other hand, by making up each stack of a known quantity and working it right out when once commenced, the call for estimating will be small, as there should be only one broken stack of each kind of fuel.

p 511. The conditions to be met in regard to the stock accounting of process supplies, in connection with the foundry and smithy, are discussed under the heading of Intermediate Process Product.

Timber. Timber stock requires special treatment in the accounts, and some aspects are discussed on pages 307-8. It may be added here that, under ordinary circumstances, it will not be worth while to attempt to subdivide the timber stock accounts by scantlings, that is dimensions, unless the timber is likely to be used in the form in which it is purchased.

The issues of timber can best be derived from timber tickets.

Assuming combined accounts are kept for all scantlings of each kind of timber, the first stage in the stock scrutiny will be to take the stock account balance and test its accuracy by abstracting the total balances, in terms of quantity, from the stock control cards for each scantling and rating same. The balance actually in the timber store may require to be supplemented by the balance in the shop in process of conversion, or on loan, as for instance when timber in excess has been issued for convenience—the excess to be returned on completion of the job.

The difference between the total values of stock shown by the stock accounts and the stock shown by the timber stock control cards, will represent the combined errors of incorrect rating and incorrect reporting of quantities used. Considerable judgment will be necessary to determine where the error lies in some cases.

The rates used should be sufficient to cover the loss of material by conversion and the normal wastage in working the timber. In

regard to other expenses, such as the wages cost of conversion, or the **Timber**. expenses of drying and storage, to allow for these in the rating will prevent the stock accounts being agreed as to book-keeping accuracy. It would also introduce certain confusion in the cost accounts by allocating as "materials" items of expenditure not included under that heading.

p. 567.

There are two alternatives with reference to distributing these expenses, the one is to apply them as a material service charge on the basis of the quantity of timber issued, and the other is to throw them into the general expenses of the wood-working department to be distributed in the form of production oncosts. These oncosts would be applied on the basis of the labour expended in working up the timber into a finished product.

p. 553.

While the material service charge will be the more nearly accurate method, the inclusion in the departmental production oncosts will be an acceptable method in many cases as being less troublesome and not seriously misleading.

In some businesses the timber stock is valued at an increased rate for each year that it has been kept in stock for seasoning purposes.

In the annual inventory this discrimination causes no inconvenience, but to recognise these fine gradations of values, according to age, in the stock accounts means complications in rating the timber used.

A serviceable compromise will be to rate all seasoned timber of the same grade, whatever its age, at a common rate, and to assume that no unseasoned timber will be used. This will allow a different valuation in the annual inventory for seasoned timber as against unseasoned or only partly seasoned timber, without seriously confusing the stock accounts. Any difference disclosed between the two sets of figures can be adjusted by charging the timber preparation and storage account—see Standing Order S 4-4.

p. 488.

Touching the conversion of timber, for instance, into wheel spokes or felloes, which are kept in stock a year or two for seasoning after being roughly cut to shape, the work of conversion should be dealt with under a stock production order and the product (the rough blocks) duly charged into stock as materials. These blocks would then be dealt with under separate stock accounts and rated at so much each, inclusive of all costs up to that **F 127**. stage.

Some difficulties arise in dealing with the stock account of painting **Painting Supplies**. supplies owing to the mixing necessary for obtaining various colours and qualities, and the impossibility of returning the unused mixed

**Painting
Supplies.**

paint into stock in the form in which the various constituents were originally issued from stock.

The difficulties are most troublesome when small values are at stake, and, therefore, a compromise is especially worth considering.

One such compromise is to fix a schedule of rates per pound, exclusive of labour, for the various kinds of mixed paints, and then to have the leading painter, or foreman if there is one, report each day to the works accounts office the quantity of paint used of each grade. This report is used for allocating the cost of paint to the individual orders, and the grand total credited to the stock account for mixed paints.

The constituent materials are drawn from the general stores as required, and the values transferred from the respective material stock accounts to the mixed paints stock account.

The labour of mixing paints should be allocated either to the particular job as part of the wages cost of painting, or, when that is not possible, to the general labouring account for the department.

The stock checking or scrutiny possible in the case of painting materials in the paint shop is limited, and for that reason it is better, if possible, to hold the bulk of the stock in the general stores, unless circumstances justify a properly supervised paint stores, as, for example, in a shipyard.

The mixed paint stock account can be watched to an extent through the fluctuations of the balance unaccounted for, though a fairly frequent survey of the stock in the paint shop will be necessary to ensure sufficient attention being given to the daily reports.

Demonstrated shortages in the shop stock should be allocated to the paint shop departmental sundries account.

**Returns from
Shops and
By-Products.**

Coming to the subject of returns from the shops, so far as the stock accounts are concerned, materials returned in the same form as originally issued get back on to stock—-from the accounting point of view—by the simple process of reducing the sum totals of issues; this is a distinctly better method than treating such returns as additional receipts. This course simplifies the agreement of the stock account receipt totals, with the purchase invoice totals, and also obviates inflating the totals on the stock control records, which is an advantage in taking out statistics of consumption.

When, however, the material returned is no longer in the same form as it was issued, such as is the case with non-ferrous swarf and defective material—for the latter cannot be passed back into stock with good material—it is necessary for the returns to be recorded as receipts under suitable scrap stock accounts. Iron and steel

p. 312.

F 123.
F 126.

F 89.

swarf and strap have too little value for this treatment to be justified until disposed of in bulk.

Returns from
Shops and
By-Products.
F 87.

The shop credit slips referring to such returns—or sales when that is the only convenient channel of information as to value—are utilised firstly for crediting the orders to which the original material was charged so far as they are recorded on the credit slips at the time and the untraceable remainder is credited ultimately to the works profit and loss account. If the works retain the scrap, the material thus acquired must be accounted for accordingly through the works accounts, which means it must be charged on to stock. It is convenient to treat all scrap as retained or passed into stock, even if it is only possible to do so as it is sold, as that stage is subject to a separate accounting procedure. The method for charging the scrap on to works stock is to record its works value on a stock product summary, under the separate heads of scrap credited to cost of orders and scrap not credited to cost of orders. The most convenient channel for aggregating the detail items for this purpose is that of a standing order in the cost allocation accounting system—refer notes under standing order U 2-1.

p. 493.

The routine offered treats scrap as a by-product of production and the treatment proposed meets the needs of by-products as ordinarily understood.

In connection with goods subject to considerable market fluctuations in price, such as copper and non-ferrous metals generally, the point arises as to whether current market prices or purchase prices shall be used in the cost allocation accounts and consequently in the stock accounts.

Rating of
Purchased
Stock.

p. 372.

There is something to be said for recognising market fluctuations, but the accounting result is apt to be unsatisfactory.

The best compromise is to adjust all stock rates yearly, or, at most, half-yearly, so that such rates shall not exceed the market prices current at the time of valuation, but otherwise the rates used will be the net purchase or cost price. A lump sum reservation or deduction from the annual stock valuation can also be made to cover the risk of unfavourable fluctuations in market values between these valuations.

In using any set of cost figures for tendering purposes, prospective market prices of materials must obviously be allowed for in the tender, whatever may appear in the cost accounts in question, so that there seems no real advantage in attempting the adjustment of stock prices in an endeavour to follow market fluctuations.

Goods purchased during the course of the year will be allocated

**Rating of
Purchased
Stock.**

at the net purchase price, as nearly as possible. To do this with precision means that each purchase of each sort and size should be used up before the next consignment is touched. In practice this result can be achieved, for accounting purposes, by charging out at a given rate the issues necessary to exhaust each purchase, ignoring whether the material is issued in actual sequence of purchase or not. Where this procedure is too tedious in view of the advantage gained, the best course is to average the purchase prices over a convenient period and adjust the rate used in the respective stock accounts accordingly.

**Rating of
Doubtful
Stock.
P. 573.**

With regard to doubtful stock, that is, stock of doubtful utility to the particular business concerned, it is much better at the annual stock valuation to make a lump sum deduction on this account, rather than attempt to write down the individual items. Of course, if stock is permanently of reduced value, through deterioration, the right course is to reduce the stock rate of such items.

There will be many cases, particularly with component stock, where the prospective utility is in much doubt and yet the stock has not actually deteriorated. It is highly desirable to recognise the risk of the stock never being used, and the lump sum deduction does this without necessitating any adjustment of rates in the stock accounts.

It is not necessary to recognise the deduction in the stock accounts so long as the financial accounts embody it as a contingent reservation. The works manager will be responsible for recommending an adequate sum, probably arrived at as a percentage of the full value.

The result will be that any item in respect to which reservation has been made, will, when used, be charged out at the normal full price, and this is fair because it is evidently worth full value in that instance.

**Stock
Product
Rates.**

In rating stock product, whether passed into stock as rough or finished, the use of inclusive rates, comprising all the elements of production cost, is advocated. The method of arriving at these

^{F 127.} stock rates is discussed on pages 515 and 523.
^{F 128.}

**General
Stock Rate
Records.**

The rating of general stock issues is so considerable a factor in the routine of the stock accounts and cost allocation accounts that the method of compiling the rate records is of some importance.

^{F 124.} These records should be independent of the purchase entries in the stock accounts, so as to allow more freedom in dealing

^{F 86.} with the goods issue vouchers or stock issue abstracts, as the case
^{F 125.} may be.

These vouchers will need to be rated and extended, as they are received in the works accounts office, with a view to their prompt entry in the cost allocation accounts. This condition will entail continual reference over the whole range of stock rates, so that the handiest form in which to keep these records will be on loose sheets suitably mounted in book form, or possibly on linen-hinged cards mounted on a stand. An ordinary card index, while affording the necessary elasticity of arrangement and renewal, is not the most rapid method in service.

General
Stock Rate
Records.

Rate records should be made in ink and dated, and, as rates are superseded, they should only be ruled through instead of being obliterated.

Further, the style of the records should be intelligible to anyone, and not be too much in hieroglyphics understandable only by the compiler.

For some classes of goods, such as wood screws, files and pipe fittings, tables will be necessary showing the net rates after deducting trade discounts of each size and variety.

Cash discounts are not usually recognised as affecting the stock rates of purchased goods. The treatment of cash discounts generally is discussed on page 530.

A matter of moment in connection with stock control records and stock accounts is that of weights and measures. Some consideration has been given to the possible reforms of British weights and measures by various associations, notably the Decimal Association on the one hand, which stands for the adoption of the metric system, and the British Weights and Measures Association, which aims at simplifying the established system by using fewer of the units rather than attempting the herculean task of adopting new units for all trades and all conditions.

Weights and
Measures
p. 390.

For works purposes all weights might be in pounds, all lengths in inches, all liquid measures in pints, and all numbers in units. The use of inches is the more debatable of the four suggested units.

The importance of these points lies in the multitude of transactions involved. Every figure saved in entering and every effort saved in calculating may mean an appreciable gain in the long run.

From the accounting point of view the difficulty is one of ready reckoner tables suited to the use of smaller units—on the other hand by working in one unit and decimals of same the application of calculating machines is immediately widened.

p. 447.

International relations during the War have emphasised the

Weights and Measures.

advantages of the metric system, whatever the difficulties in the way of its adoption.

Ready Reckoner Tables.
p. 552.

The preparation of special ready reckoner tables is not a very formidable task if one is equipped with suitable lithographed forms, on paper from which photo prints may be taken, and the master calculator tables that are on the market.

There are many net rates, resulting after deduction of trade discounts, that are not provided for in the majority of ready reckoners which cater more for selling and purchasing purposes than for stock or cost accounts.

When these rates are expressed as shillings and decimals of shillings, as they can be so conveniently, ready reckoner tables are now available for applying such decimalised rates for quantities in one unit, such as hours, pounds, inches, pints, with the utmost ease, giving the extension to the nearest farthing.

If special ready reckoner tables are prepared, local requirements can be met to a nicety as to rate and range, and also in terms of the simpler units suggested above.

p. 447.

The use of simpler units obviously extends the application of mechanical means of calculation. In stock accounts a most important use of mechanical calculation lies in abstracting the totals of the receipts and issues each account period for agreement purposes.

Stock Ledger.

The method of keeping the stock accounts must necessarily be in ledger form, the stock in hand and receipts appearing on the one side of the account and the issues on the other.

The term stock ledger is applied to the stock accounts as a whole.

Two forms of stock ledger are usually necessary :

F 123

General Stock Ledger,

F 126.

Component Stock Ledger.

Notes as to the stock ledger routine are given alongside the specimen ledger rulings.

Returns from the shops, as previously stated, are treated as reducing the issues, except in the case of scrap, which constitutes a by-product or material in a new form and is recorded, therefore, as a receipt.

Returns from customers are also in the nature of fresh receipts, and must be treated accordingly.

The transactions in connection with the keeping of the stock ledger may be tabulated as follows :

STOCK LEDGER.	
RECEIPTS.	ISSUES.
Purchases—per Goods Received Notes. (F 82.) Stock Products Returns from } Stock Customers } Product Scrap Receipts. } Summary. (F 119.)	Issues. { <ul style="list-style-type: none"> per Goods Issue Vouchers. (F 86.) per Stock Issue Abstracts. (F 125.) per Foundry. Smithy. Power House. Painter. Builder. Electrician. Millwright. (F 76.) per Timber Tickets. (F 88.) per Tool Store Reports for departmental sundries chargeable to direct production instead of overheads.
	<i>less</i> Returns from Shops, per Shop Credit Slips. (F 87.)

Stock Ledger.

It is necessary that the stock ledger should be agreed regularly in regard to its bookkeeping accuracy.

The first stage is to verify that the totals entered on the receipts side of the stock ledger agree with the total expenditure in respect to stock as recorded in the works accounts register, which in turn F 115. is agreed with the financial books.

On the issue side of the stock ledger verification is a more involved matter.

Assuming for the moment that all the goods issue vouchers and other vouchers are correctly rated and correctly extended, the entries in the stock accounts can be tested in total against the totals of stock issues entered in the cost allocation accounts. Both sets of entries are derived from the same vouchers, and agreement of totals may be accepted as evidence of correct posting and correct totalling in both cases.

In making this test, mechanical means for making the totals will save a great deal of time and minimise the risk of inaccuracy being introduced at this stage.

The cost allocation accounts need to be divided to correspond with F 130. the main sections of the stock ledger, viz., general stock and component stock.

Small differences may have to be passed, but it must be borne in mind always that a small difference in grand totals may represent a balance of relatively large errors.

With the stock ledger entries of receipts of issues verified to the above extent, there remains the question of whether the issue vouchers have been correctly rated and extended.

Obviously, any error in this direction will be reflected in the balances of the various stock accounts. These balances may be

Stock Ledger. considered as the book values of goods to be accounted for by the respective stores. The object of continuous stock scrutiny, as already discussed, is to verify the existence of this balance of stock, and, in so doing, to confirm that there is no error in the book values.

p. 373.

As it may be assumed that all issue vouchers have been duly noted for stock control record purposes, the balance of stock shown by these records ought to work out in value to agree with the stock account balance. It will constitute a valuable application of stock scrutiny, although limited to records and not based on actual stock checking, if the stock control record balances are frequently valued in this way. A reasonably near agreement will confirm the general accuracy of the issue vouchers applying to the respective accounts that are tested, and by inference a general accuracy all round in the work of rating and extending the issue vouchers.

Given these conditions, the stock control record balances can be checked against the actual stock at any convenient time without bringing the stock accounts into line at that moment.

The proving of a high degree of accuracy in the stock accounts, and in the stock control records, will meet all reasonable requirements of cost accounting, without the actual auditing of every entry as necessary in the case of financial accounts.

**Stock Values
for Profit and
Loss Account.**
p. 567.

The problem of the annual stocktaking with its dislocation of production and its expense has naturally given point to the possibility of accepting stock ledger balances in lieu of a special inventory.

The feasibility of this course depends entirely on the efficiency of the stock scrutiny, for, without a high degree of accuracy in the stock accounts is demanded and obtained, the stock ledger can never be relied on for the purposes of the annual trading account.

On the other hand, it should be remembered that an actual inventory taken under the usual rush conditions is quite likely to include some errors as to quantities and descriptions.

If stock accounts are kept, comparison of the book balance at the date of stocktaking may be made with the inventory and glaring errors discovered.

p. 573.

When the stock accounts are kept under the conditions recommended here, the errors in the book values are very unlikely to be appreciable, and may easily be less than those occurring with a merely annual inventory.

With adequate provision made each year for doubtful stock and unfavourable market fluctuations of raw material prices, a little extra reservation can conveniently be made to cover the likely

errors in the stock ledger balances, if these are accepted as the true stock value.

Stock Values
for Profit and
Loss Account,
p. 373.

Given an established and efficient system of stock scrutiny, the most careful professional auditor could accept a certificate of stock values based on the stock control records.

F 89.

The rating and extension would have to be carried out as for an ordinary stocktaking, and compared as to class totals with the stock accounts.

The stock control records may be thrown open to the auditor, so that he may test any item of quantity he desires.

The usefulness of reliable stock accounts for constructing approximate profit and loss statements, quarterly or half-yearly, will be readily appreciated. The building up of an inventory from stock control records would only be necessary for annual balance sheet purposes, intermediate requirements being met by an abstract of the stock account balances.

F 164. p. 570.

VH

STOCKTAKING

Problem of Stocktaking. STOCKTAKING is the taking of an inventory of stock, usually for the purposes of the annual balance sheet or on the sale of the business.

This requirement may be held to be entirely financial and seem outside the conception of a record for administrative purposes and even beyond the scope of cost accounts. The process of stocktaking so intimately touches the ordinary field of administration and, to be efficiently carried out, requires so much technical assistance that it is likely to be in the best interests of the firm for stocktaking to be treated as a function of technical management and its lessons appreciated and utilised for administrative purposes.

p. 287. In the summarised balance sheet as issued to shareholders the items that stocktaking covers are commonly referred to as stock of stores, timber, metals, loose plant, tools, etc., and work-in-progress. "Stores," in the sense used there, may be interpreted as the ordinary goods held in the stores department other than timber and metal, and described on page 288 as auxiliary supplies. The expression as a whole is a conventional one used by accountants, that means virtually all loose assets in the works other than drawings and patterns; while under some conditions, jigs and special tools may also be dealt with separately like drawings and patterns.

p. 467. In the case of drawings and patterns, jigs and special tools, the policy advocated is to allocate the costs of same in the first instance to the orders for which they were originally required and to transfer as little of that cost as possible to capital account. Under such conditions the book value of these items will hardly need to be corroborated by an inventory.

p. 425. Under certain conditions of mass production, where staple lines are manufactured continuously, the loose equipment is likely to be so largely special that it may be too serious a matter to exclude jigs and special tools from the annual inventory, and in that event the methods hereafter proposed for valuing loose plant will need to be

amplified accordingly. The suggestion may be made here that, in such cases, the equipment should be grouped according to the individual lines of product on which used, and the group values considered in the light of prospective sales of each line. Problem of Stocktaking.

It will be observed that buildings, machinery, and fixed assets generally are assumed to be outside the range of the annual stock-taking. This arises from the fact that fixed assets can be valued from the accounts with confidence, if adequate care is taken in the recording of works additions expenditure and in making adjustments as to plant discarded. The valuation of buildings, machinery, and fixed plant is considered elsewhere.

p. 421.

Turning to the scope of stocktaking as ordinarily necessary, the divisions to be dealt with, in pursuance of the lines provided in the scheme of cost accounts developed in Section VI are as follows :

General Stock.

Raw Materials.

Iron and Steel.
Non-Ferrous Metals.

Non-Metallic Materials.
Timber.

Auxiliary Supplies.

Building Supplies
Electrical Supplies
Engineers' and Pipe-fitters' Supplies
Foundry Supplies.
Fuel and Spirits.

General Sundries.
Hardware Sundries
Implements and Materials
Liquids and Greases.
Painting Materials.
Stationery and Paper.

Standard Fittings.

Fittings and Components.
Bolts and Fastenings.

Component Stock.

Rough Components.
Finished Components for Assembling.

Warehouse or Saleable Stock.

Completed Products.

Spare Parts

Work in Progress.

Iron Foundry Process Account.
Brass Foundry Process Account.
Smithy Process Account.

Sales Production Orders (Series A).
Sales Repairs Sundries Orders (Series B).
Stock Production Orders (Series C).

(Manufacturing Departments.
Repairs Department.
Testing Department.
Tool Room.
View Room.
Work Depot.
General Stores (Special Materials not issued).

Loose Plant.

Beltng and Driving Ropes.
Gauges and Measuring Appliances.
Hand Tools—Engineers'.
Holding Appliances for cutting tools.
Holding Appliances for work.
Machining Tools.

Ordinary Implements and Utensils.
Portable Mechanical Appliances.
Portable Shop Accessories.
Special Trade Tools and Accessories.
Testing Gear.
Transportation, Lifting and Weighing Appliances.

Packages.

Packing Cases, Crates, Drums, Barrels, Bags, etc.

Office Equipment.

Office Fixtures.

Office Furniture.

Office Accessories

**Problem of
Stocktaking.**

The work of stocktaking covers the actual counting and weighing of stock, summarising, valuing or rating, and extending the items; and comparing the result with the book values as given in the stock accounts.

The existence of a complete and reliable system of stock accounts will allow the work of actual counting and weighing to be done on organised lines, and to a very large extent before the date for which the inventory has to be rendered.

Reliable stock accounts will mean a severe test of the accuracy of stocktaking, and the very conditions that allow the work of stocktaking to be organised in advance will enforce a high standard in that work.

However trustworthy the stock accounts may prove to be, it will not be admissible to accept book values of stock in lieu of actual count and weighing, without at least an extensive verification or scrutiny.

For the counting and weighing processes of stocktaking it is very common to close down the factory for a few days, sometimes for a week, at the end of the financial year. Usually the interval is put to good use in other directions, such as overhauling power and transmission plant, whitewashing building interiors, etc., but when the financial year ends on December 31st, as so commonly is the case, the weather conditions are not particularly appropriate for stocktaking or repairs. The growing tendency to close down August Bank Holiday week for an annual holiday for all grades of works staff and workers, gives an alternative opportunity for annual repairs, and is some inducement to organise stocktaking on such lines that a very brief stoppage at the end of the year will suffice.

There is the other aspect of stocktaking, namely, the clerical work after the event. This is not only apt to be of a laborious character, but can seldom be done very satisfactorily by other than the regular staff, with the consequence of entailing excessive hours and a dislocation of current work. The delay that often ensues in the presentation of the final returns is itself a very serious indictment of the methods used. Prompt returns are sometimes achieved by virtually rough and ready ways which, under some conditions, may be more acceptable to the directors than more accurate returns that are rendered less promptly. Such rough and ready ways can hardly be tolerated if the scheme of the stock accounts is such as to set a high standard of accuracy.

It is, therefore, part of the problem of stocktaking to get prompt results by the regular staff without excessive hours, and within the limits of accuracy prescribed by the works accounts. Some congestion of work at such a time can hardly be avoided, but it can be

brought down to manageable proportions if each fortnightly account period throughout the year carries its own burdens, so that the course is clear at the year end for closing all works accounts speedily.

Problem of Stocktaking.

The important function of works accounts, including therein both stock and cost accounts, in regard to stocktaking, consists in confirming the inventory figures and ensuring that no item is omitted.

While the desirability of employing the regular staff holds good, the existence of properly planned works accounts make it safe to parcel out the stocktaking work with confidence to any clerical staff that can be commandeered for the purpose, without relying solely on the efforts of the works accounts office. A programme should be drawn up beforehand, under which all the office staff, works and commercial, are made responsible for specific elements of the work, which, when done, absolves them as to the rest of the programme. In such event each party must appreciate that any carelessness discovered in his work will be considered by his own chief as a breach of duty. The divisions listed above may suggest the lines to be followed in arranging a programme both of the stocktaking itself and its concluding stages.

There is the further possibility of utilising outside agencies for the extensions and totalling.

There can hardly be any question, for the above reasons, of all inventory records being prepared on loose sheets, to be finally bound in sections before being submitted to the company's auditors. In this connection it may be remarked that the inventory sheets should be written on one side only, and that each sheet's totals should stand alone and be summarised on separate sheets. The summary sheets for all sections can advantageously be bound together, and then as the detail sheets are audited and agreed with the summary, they can be passed back to the works accounts office, only the summary being retained permanently in the financial department.

F 140.
F 142.
F 144.

The simple device of each sheet's totals standing alone, instead of being carried forward to the next sheet and so on, has far-reaching effects in getting the work forward, and any errors that are discovered in checking or auditing will only affect the summary of the sheets totals. Obviously the sheets of each section must be numbered before being parcelled out to the different clerks, and each sheet must be initialled by those doing the different stages of the work, viz., checking entries from stocktaking slips or tallies, certifying rates and checking extensions.

F 139.
F 141.

With regard to the preparations that may be suggested for stocktaking, there is something to be said for reducing the volume of

Preparations for Stocktaking.

**Preparations
for Stock-
taking.**

work in progress as much as possible, and still more for clearing up old orders, but, except in the case of seasonal industries, when stocktaking coincides with the slack season, as it obviously should, there is danger of lowering the pace of the shop after stocktaking if too much stress is laid on having a clear shop floor beforehand.

In the case of purchases, it is certainly desirable to avoid delivery of goods, so far as practicable, immediately before stocktaking, but it is possible to cut this matter too fine, for the unceasing supply of materials of the right sort is the fundamental basis of output efficiency.

Interference with output will always be too big a price to pay for a saving in the stocktaking labour.

As for scrap that has to be disposed of, its collection should be continuous, to keep the shops clear at all times, though stocktaking may be made a good reason for more heroic efforts when same are necessary. The disposal of scrap is a question of market prices to an extent, but any bulk of saleable scrap should be avoided at stocktaking, as involving either very rough estimates of quantity, or an unnecessary and comparatively costly handling of same, not to mention the possible difficulty of forecasting the price that the scrap will realise.

It will be advantageous to have the tare weight of barrows, trolleys, trays, portable bins, etc., confirmed and painted on each as stocktaking approaches. It may be well also to hire extra weighing machines, as the cost may be easily saved in overtaking the work in different departments or localities simultaneously.

The character of the stores organisation must largely affect the work of stocktaking and influence the feasibility of any advance preparations.

p. 301.

The scheme suggested previously of holding certain classes of goods in two divisions of "wholesale" and "retail" is especially valuable at stocktaking. Goods such as those classified under standard fittings are perhaps the best example. In such cases the retail or broken parcels would not be counted until the date of stocktaking, whereas the wholesale stock would particularly lend itself to advance counting. In making up parcels for wholesale stock, and for counting any quantity of comparatively small details, the use of counting or proportional weighing machines is to be strongly recommended. These can be arranged for counting tens and multiples or by dozens and multiples, and the former is the better style, in that most of the stock control records can be kept more advantageously in unit quantities. The general adoption of units for recording quantities, in lieu of grosses, dozens and odds,

and the use of lbs. for recording weights, in lieu of cwts., qrs. and lbs., would materially simplify stocktaking, apart from other considerations, but weighing machines, price records and ready reckoners will usually impose limitations that will involve some trouble to remove, though once removed the gain will be permanent and far-reaching.

**Preparations
for Stock-
taking.**

p. 337.
p. 331.

Weighing machines that will record the weights placed on the platform will prove very useful in stocktaking. Incidentally it may be mentioned that, with heavy materials, two weighing machines and two gangs of men may advantageously serve one stocktaking clerk.

In the different stores it will be a great gain if stocktaking slips ^{F 139.} are made out for each item some weeks before stocktaking commences, as to references, description and usefulness.

The question of usefulness of stock is very important and is a matter that requires thorough treatment by persons fully qualified to exercise the necessary judgment. The difficulty lies frequently in getting enough consideration given to the matter. In the case of general stock, the storekeeper may possibly be qualified to draw up lists of standard kinds and sizes, and when these have been approved all other stock may be conveniently termed "non-standard."

p. 299.
p. 573.

Non-standard stock is not necessarily bad stock, but its usefulness to the factory is in some doubt, and the fact must be indicated on the stocktaking slips.

In the matter of component stock, the authorisation of reserve ^{F 57.} stock quantities, rough and finished, will supply the necessary data as regards usefulness, and the slips may be marked either authorised or unauthorised as may apply.

p. 310.
p. 520.

The works manager should confer with the drawing office and repairs department to amend or confirm the authorised list of reserve component stock from time to time, particularly before stocktaking.

The advantage of dividing the general stock into standard and non-standard, and the component stock into authorised and not authorised, is further discussed in connection with stock valuation.

p. 396.
p. 397.

Assuming that stocktaking slips have been made out and attached to the respective bins, etc., a further stage may be undertaken towards stocktaking, viz., for the stores staff to take the stock gradually and mark same on the slips. Immediately this process is started, all receipts and issues must be indicated on the slips and a line drawn if any such entries are found on the slips when the stock comes to be taken. All entries after first taking stock will, of course, qualify the total in stock accordingly.

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for Stock-
taking.
p. 373.**

With this work well started, the works accounts office clerk, who is ordinarily responsible for stock scrutiny, as previously referred to, will need to increase his attention to this matter, and may be helped out by selected juniors. It will of course always be desirable for stock to be taken in the presence of the party responsible for stock scrutiny.

If the stock scrutiny serves to verify the stock given on the tallies on the bulk of the stock items, the official stocktaking on the actual date will resolve itself into an extended stock scrutiny, with the important difference that only such items need be counted again on that date as is necessary to prove that all receipts and issues have been entered on the tallies since the stock was first taken.

This comprehensive stock scrutiny should have its official character emphasised by the co-operation of independent officials. The main point is to establish such discipline in the stores, prior to the official stocktaking, that the chances of errors through carelessness or misadventure may be reduced to a negligible minimum.

It may be well for the management to bear in mind that errors in stocktaking are practically inevitable when all and sundry have to be employed to get every item actually counted or weighed during the official stocktaking. Any risk, therefore, that is thought to attach to the present suggestions is not necessarily greater than under any other scheme and ought to be far less.

Another preparatory process is necessary to ensure that there shall be a stocktaking slip or tally for every lot of goods, and that every slip shall be duly transcribed on the stock inventory sheets. The method recommended is to use numbered tickets made up in the style of cash tickets as commonly used in retail shops, viz., a counterfoil with perforated ticket attached with the same numbers appearing on both. These numbers will constitute lot nos. and no number should be used twice, however different the connection. The perforated tickets will be attached a few days before stocktaking to every lot of stock that a careful search can discover, and the location reference, for the most part the bin no., will be entered on the counterfoil and on the stocktaking slip as well. The counterfoil must be marked to show that the lot no. has been entered on a corresponding stocktaking slip.

The collection of the slips in proper sequence of lot nos. will be facilitated if the lot nos. run in sequence vertically down rather than horizontally across the stacks of bins.

p. 316.

In the case of the stock of completed product it may be assumed that tallies giving all particulars, notably production order no. and date, will be kept permanently attached to every item, so

that it will be easy to make out stocktaking slips for stocktaking purposes. Lot no. tickets may be used here but may require to be pasted on, and, in the case of old stock, the reference may be useful at the next stocktaking if the old lot no. is noted on the stocktaking slip before the new lot no. ticket is pasted over the old one. These lot nos. may also be usefully noted on the stock control cards for identification purposes if the item is not strictly present standard. It will be convenient to enter up the stock direct on to stock inventory sheets, the lot nos. being quoted and grouped to correspond with the classes obtaining in the sales records.

Preparation
for Stock-
taking.

The preparations for stocktaking discussed above should be made the subject of careful instruction adapted to the local circumstances, and the names of the persons responsible for each stage in each stores should be clearly set out.

The need for specific instructions and definition of responsibility will hold equally good for the stocktaking of work-in-progress, loose plant, and office equipment.

The preparations possible for work-in-progress must be so dependent on the nature of the business that no very definite suggestions can be made. Generally speaking, the best line to take will be to accumulate, as far as possible, all work not actually in hand immediately before stocktaking, within the work depot where such exists, and after that within the view room, and what then remains in the shops, not actually in hand, should be collected in one or two definite areas within the shops. Such arrangements should hardly be foreign to the normal method of running the shop, except perhaps as to the work for the next job not being placed near the respective machines just before stocktaking.

p. 151.

F 141.

The advance preparations of work-in-progress slips on the lines suggested for stock tallies, will probably have to be limited to the items in the work depot, though something may be possible in that direction in the view room, as well as for work on the shop floor. In the case of work actually in hand at closing time before stocktaking, a slip agreeing with each current work card or job ticket should be made out by the foreman or his assistant, and collected before each worker leaves—the worker's check no. and operation in hand being entered on the back of the slip.

The problem with work-in-progress is to get the stage at which the work has arrived indicated sufficiently clearly for valuing purposes. The entries on the slips should, therefore, be checked against the work itself by the person responsible for its valuation, preferably the production estimator. The material weight of all work-in-progress should be recorded as far as ever practicable,

**Preparations
for Stock-
taking.**

and this can be proceeded with by less technical help than is necessary for making the slips out or describing the condition or stage of the work.

The application of lot nos. to work-in-progress is not as useful as for general and component stock, because the location reference will be so short-lived, otherwise it might save much time in finding the items after stocktaking for confirming valuations. Under a proper scheme of production regulation, the location question should not be serious, and may never arise if the slips are properly checked at the time of collection as suggested.

Instead of lot nos. being given by separate tickets, the slips can be numbered for the same purpose, and if prepared from the records of the work depot, the lot or slip nos. can be indicated there, and there will be little trouble in ensuring that no item of work-in-progress has been overlooked. A more direct scheme, and one likely to be more effective, is to rely on the sub-order reference for each lot, when sub-orders are issued on the lines advocated for component production.

Coming to loose plant, the scope and organisation of the tool stores will affect the preparations considerably. If there is a reserve tool store for the margin of tools over and above common requirements, this stock can be dealt with the same as general and component stock as to stocktaking slips being filled in completely. In the case of the tools on regular loan, a list of each kind of tool prepared by the tool store chargehand on suitable loose plant inventory sheets will be the better way, the quantities being subject to confirmation at the official stocktaking.

In the matter of the tool kits on permanent loan to the men, the tedious process of examining each man's kit can be minimised if individual tool records are in use on the lines previously proposed. These records can be analysed and a certain number, preferably all, verified round about the annual stocktaking date, though not necessarily before then, by the tool store chargehand.

In certain departments there will be considerable loose plant that can only be dealt with by collecting together and counting or weighing same. The departmental foreman will, in his own interest, get the work of collecting the items advanced as much as possible, and he may even be made responsible for rendering a return of loose plant in his department. It will be a great help if the foreman's statement can be accepted, and, with the loose plant accounts kept on the lines recommended, there will be means of checking these statements. Beyond that the basis of valuation may be expected to minimise the seriousness of any likely errors. As a matter of fact, to send office clerks into the shops for this purpose intro-

duces a medium for making the records that must be dependent on the foreman or a mechanic for most of their technical information, and withal, such clerks have not the influence over the labouring staff necessary for expeditious work, nor the opportunity of getting the work done in advance to any useful degree.

**Preparations
for Stock-
taking.**

It will make for better results, and mean a distinct saving in clerical labour afterwards, if each foreman renders his return on loose plant inventory sheets under the different headings as laid down by a loose plant classification list. From this source he can derive his instructions as to the details required for valuation purposes.

p. 429.

Packages constitute a class of stock that comes conveniently under the heading of loose plant. It may be assumed that as far as possible all suppliers' packages will be returned before stocktaking. Packing cases made specially for continuous service in connection with production are, of course, loose plant in the strict sense of the term, and effort should be made to get these back before stocktaking, though letters from the firm in question acknowledging their possession will serve as certificates to support their inclusion on the stock inventory sheets.

p. 328.
p. 459.

Office equipment can be inventoried with safety a little before stocktaking if due regard is paid to any additions about that time. Measurements of shelving, etc., necessary for valuation will not require to be repeated each year, but the slavish repetition of a previous year's inventory must be avoided, as office equipment items of an easily portable nature are likely to have a high value in these days of labour-saving appliances. Their existence and condition should be verified each year. Incidentally such annual inventories are of important use in case of fire.

p. 404.

A matter of possible consequence at the annual stocktaking is that of goods on loan.

**Goods on
Loan.**

Packages sent out for which no charge has been made is a possible instance of goods on loan, but it may not be policy to insist on their return in time to be included in the stock valuation, and it may be doubtful practice to assume an amount for such unreturned packages in the stock inventory. If such packages have been invoiced or charged out, their inclusion in the inventory will not be permissible.

In regard to goods sent on loan or on approval in the ordinary sense, these should be dealt with in the financial department as having no further concern to the works unless returned.

Stocktaking is obviously a time for all loans of goods to be settled up as far as practicable, whether related to goods loaned within the

**Goods on
Loan.**

- works, goods received on loan or approval, or goods sent out on loan or approval. The office copies of acknowledgments of sundry goods received will provide the basis for clearing up the items for which the works are responsible, and prevent such items being wrongfully included in the firm's own stock. A separate inventory sheet should be made out for loaned property in hand at the time of stocktaking, and this must be clearly marked to prevent misunderstanding.

**Valuation of
General
Stock.**

- An important condition in dealing with the valuation of general stock is that the stocktaking slips be sorted out to correspond with the sequence of accounts in the stock ledger.

If all the items pertaining to the same stock account are grouped together, it becomes possible to insert the stock ledger balance alongside, and this should serve to bring out serious errors in either the stocktaking or the stock accounts.

In the matter of rating, the purchase costs must be followed consistently, so long as they do not exceed the current market prices. The fluctuation of market prices will not usually affect very many items, and consideration under this head will be mainly centred on non-ferrous metals.

The terms in which the certificate of stock in hand is rendered to the auditors should be that the stock has been taken at, or under cost price, and that in no case does the value exceed the market price.

p. 391
p. 573.

Reference has previously been made to stock being standard or non-standard, and this division is of vital importance in the inventory as a whole, but it is desirable not to differentiate in rating the items.

It is necessary to make a deduction from the total stock values in respect to the liability of certain items proving bad stock, much the same as in the financial accounts a provision is made for doubtful debts in appraising the asset value of outstanding debts.

- Separate stock inventory sheets are used to differentiate between standard and non-standard stock.

If the works organisation is not sufficiently advanced to carry out a scheme of standardisation, the grouping may be under the heads of good stock and doubtful stock.

Attention is directed to this matter, as investigation in many works would discover large stocks of doubtful value, that have been bought to some recognised commercial specification and have no peculiarity or fault beyond that of not being in current demand by the works. Having made this division in the stocks, attention can be concentrated on using up the non-standard stock, and

ultimately reducing the amount of investment necessary in general stock. **Valuation of General Stock.**

Excessive stock of a standard item should be treated, as regards the excess, as non-standard stock, in view of the long period necessary for its consumption.

Millwright supplies and the like that have not been issued from the general stores, and not charged to works repair or other orders, may quite properly be included in the stock inventory at full price, subject always to adequate confirmation as to their usefulness.

Stationery stock, so far as this is special in any way to the firm's business, should not be valued in the stock inventory, although advisedly held under proper stock control. Such stationery should have been already charged to expenses, either production or commercial, as received.

The foregoing remarks as to the valuation of general stock apply fully in principle to component stock. The reserve stock of components should be distinguished as to whether "authorised" or "unauthorised," and adequate financial reservation should be made in the final total values in respect to the unauthorised stock. As with general stock, the detail rates of doubtful stock should be left intact. **Valuation of Component Stock.**

p. 391.
p. 520.
p. 573.

The financial reservation in respect to doubtful stock should be fixed independently each year on the general merits of the position, but if the gross amount does not decrease, the reservation should be increased, that is the net stock value reduced, as advancing age in the unauthorised stock will emphasise its dubious usefulness.

In the case of completed product it is necessary to treat each item on its merits. If the individual works values have been fixed properly, there may be little need to review the inventory values, but, as a matter of precaution, this section of the inventory should be scrutinised to ensure that the probable realisable prices, after providing for selling expenses, have not been exceeded. **Valuation of Completed Product.**

p. 573.

As regards deterioration, due to age, and depreciated market values, owing to the supersession of design, these should be provided for in the inventory valuation, by writing down the individual values. In the event of a sale later, the depreciated or book value would be charged out. In the matter of items for which the design still remains the firm's standard, but which is selling very slowly, the individual items need not perhaps be permanently depreciated, but some financial reservation must be made in the total values.

**Valuation of
Work-in-
Progress.**

p. 580. F 132.

The valuation of work-in-progress is best considered as the process of confirming the cost ledger balances, and approximate estimates of the values may, therefore, be admissible. It is usually not a safe practice to assume cost ledger balances to be correct without a fairly close verification.

F 142. The specimen work-in-progress inventory sheet provides for the cost ledger balances to be entered alongside the estimated values, and then for the value adopted for inventory purposes to be separately entered.

Under a scheme of cost accounts properly administered, there should be little hesitation in accepting the cost ledger balances for the actual inventory values, provided that such figures in no case exceed the selling price after allowing for probable commercial expenses.

The work-in-progress inventory should only include items of product destined to be marketed.

In detailing the stage in which the items of product are at the time of stocktaking, it will often be convenient to compromise a little to simplify the rating. Thus machined items may be taken as half-machined, quarter-machined and so on, rather than attempt to record all the gradations of machining that may occur. The extent of the compromise must depend obviously on the character of the work. On repetition work, with operation sequences established, the condition of work can be stated very precisely and suitable rates readily obtained. All items should be weighed for checking the material valuation.

p. 33.
p. 572.

In reviewing the totals of the work-in-progress inventory, it is of much importance to give consideration to making an adequate reservation for unexpired or unexpired liabilities in respect to guarantees applying to the product of the year, if the financial accounts are to represent the firm's true position.

Experimental orders in progress at the end of the financial year require to be dealt with when settling the value to be carried forward on the works account annual abstract.

V J

PLANT RECORDS

It is convenient to use the term plant here in its widest sense as **Introduction.** meaning all equipment necessary to production, whether in the form of buildings, machines or tools.

Under normal financial conditions expenditure for these purposes is capitalised or, in other words, given an asset value in the balance sheet. The extent to which these various forms of property are subject to deterioration is termed depreciation, while a decline in value through inefficiency as compared with improved plant or through a change in production requirements, is termed obsolescence.

Depreciation and obsolescence constitute very substantial items of production costs in most industries and their determination calls for wide experience and skilled technical judgment. This subject is dealt with separately in Section V K, but a passing reference is made here as plant records of one kind or another are requisite to a proper performance of this administrative function.

A plant record card for each specific item of buildings and fixed **F 64.** plant is very desirable for reference by the works manager, production estimator, and, of course, the plant engineer himself, if the works are large enough to have such an officer.

These record cards would be initiated by the works accounts office in respect to additions, either from the invoice—if purchased—or from the plant order costs—if made on the works—and then **F 137.** supplemented with such details as the technical management require.

Attachments and accessories associated with any machine should be noted on the respective plant record cards and should themselves actually bear the identification no. or plant no. of the machine to which they belong.

In the matter of plant nos. it is obviously necessary to have some means of identifying each machine or other unit of plant.

Introduction. Consecutive numbers taken up as the plant is acquired can serve as plant nos. and have to serve in many cases. It is, however, more convenient to adopt a system of identification that shall at the same time classify the plant. Such a classification is of use for various purposes, amongst them being the indication of type of machine, by its identification no., on plant orders, job records, plant stoppage reports, plant register, etc., and for grouping values of plant that can, without excessive inconsistency, be considered as subject to a common rate of depreciation. No classification short of treating each item on its own particular merits can claim to be an accurate basis for depreciation rates, but the exigencies of commercial practice make compromise essential and any degree of classification is likely to be better than lumping all kinds of plant together under one flat depreciation rate.

F 96.
F 158
F 61.
F 145.

**Grouping of
Plant
Records.**
p. 416.
p. 481.

The following table of standing orders for cost allocation of works expenditure on capital additions conforms to the requirements postulated elsewhere for depreciation, valuation and production oncosts and therefore, if accepted for those purposes, should govern the grouping of all plant records.

N 1-1, Drawings and Patterns.

p. 467.

Drawings and patterns should be made under the original sales or stock production order concerned, and only a proportion of the cost, if any, depending on the likelihood of repeat orders, should be transferred to capital additions under this account.

N 1-2, Jigs, Special Tools and Gauges.

p. 467.

This is a short title intended to cover jigs, fixings, gauges and any tools that are quite special to the line of product for which used.

The remarks above *re* drawings and patterns entirely apply here also, with the further point that only quite a small capital value should be placed on jigs and special tools where there is the least chance of even slight modifications of designs. Alternatively, when circumstances necessitate capitalising a large expenditure, a very high rate of depreciation should be allowed. Jigs and special tools so easily become obsolete, and being necessary for replacements, cannot very well be modified, if it were possible to do so.

N 2-1, Land and Buildings.

This will include fences, roads, railway sidings (firm's property), tramways, gauntries (when built in) and machinery

foundations. The inclusion of the latter here is better in that such foundations become an integral part of the building and not of the machinery. Some care is necessary to adjust the book values when special foundations become useless through removal of machinery. If the cost of new foundations is included in the cost of removal and charged to works expenses (standing order S 2-6), little adjustment, if any, may be necessary of book values.

Grouping of
Plant
Records.

p. 485.

Building numbers should be allotted as required and quoted in the accounts.

N 2-2, Motive Power Plant.

This is intended to include all kinds of power generating plant, though subdivisions may be possible in some works, such as between steam power and electrical power—in other works, as between separate power stations.

N 2-3, Mechanical Transmission.

This will include the chain or spur gearing leading to the line shafting together with the line shafting and pulleys, but not belting or ropes—see N 2-9. Chains would be included here as being an integral part of the gearing.

Countershafting should be included with the machine concerned.

N 2-4, Electrical Transmission.

This will include cables, switches and the like, together with the electric lighting system—the latter possibly as a subdivision.

Motors are better placed under motive power plant.

N 2-5, Pipe Transmission.

This is intended to include all kinds of pipe systems with their tanks, valves and connections.

Typical pipe systems are those for steam, water, gas, air and suds.

Fans and blowers should be included here together with the rest of the fixed equipment pertaining to heating, ventilating, gas lighting and fire prevention.

Power plant pipes within the power department are more appropriately included under motive power plant.

Grouping of Plant Records. **N 2-6, Transportation Plant.**

This will include cranes, runways, lifts, locomotives and rolling stock.

Loose lifting tackle will come under loose plant (N 3-1).

Though not quite within the title it will be convenient to include fixed weighing machines or weighbridges here. Portable weighing machines will come under loose plant.

N 2-7, Shop Fixtures.

This will include what valuers often term trade fixtures and fittings, and obviously the character of the trade will determine the nature of the items to be included. The more typical items are benching, shelving, shop partitions (when not considered as part of the building), permanent store fittings and the like. Foremen's offices will usually be included here if only as partitioning. Also machine guards.

N 2-8, Special Process Plant.

This has reference to plant peculiar to certain processes and has for its object the separation of departmental plant outside the definition of machine tools.

The account will include such plant as heating furnaces, smithy hearths, core-stoves (if not part of a building), sand-blasting, oxy-acetylene apparatus, and so on.

N 2-9, Machines.

p. 423.

The scope of this account will be fairly obvious, though a variation from common practice is advocated, as to the accessories purchased with each machine, such as chucks.

For control purposes and also for reasons of depreciation, machine accessories of this character should be valued as loose plant and not included in the machine values. Much confusion results in loose plant inventories otherwise.

The practice is also recommended of including belting with loose plant rather than with the machines because the upkeep of belting is a matter quite apart from the machines themselves. Considered as an item in the cost of installing a machine (which, except as to foundations, belongs to this account), belting is too small a proportion of the whole for it to matter seriously whether the initial belting is charged here or treated from the start as loose plant.

The separation of belting repairs and renewals (S 2-4)

from machine repairs (R 2-9) is, in any case, very desirable.

Installation costs should be charged here, but under a sub-heading, similarly with other plant. Loose machine guards may be charged to N 2-7.

Grouping of
Plant
Records,
p. 482
p. 485.

N 3-1, Loose Plant.

The items covered by this account will be fairly obvious, due regard being paid to the exclusion of jigs and special tools (N 1-2), and the inclusion here of machine accessories, and belting referred to under standing order N 2-9.

p. 426.

The cost of packages built for works service, such as between the works and outside foundries, should be charged here.

Departmental sub-accounts will be useful, though it will possibly be equally or even more useful to have sub-accounts under the group headings suggested further on for the classification of loose plant, viz. :

p. 429.

1. Belting and Driving Ropes.
2. Gauges and Mechanical Measuring Appliances—Standard.
3. Hand Tools—Engineers.
4. Holding Appliances for Cutting Tools.
5. Holding Appliances for Work.
6. Machining Tools.
7. Ordinary Implements and Utensils.
8. Portable Mechanical Appliances.
9. Portable Shop Accessories.
10. Special Trade Tools and Accessories.
11. Testing Gear.
12. Transportation, Lifting and Weighing Apparatus.

It is not easy in the case of loose plant to discriminate between additions and renewals.

Where there is any doubt the expenditure should be considered as renewal and charged with repairs (R 3-1).

p. 483.

It is possible for an item that was additional in the first instance to prove, before the next inventory, to be a renewal by reason of the scrapping of one of the original stock or supply, to which the new one seemed at the time to be an addition.

Grouping of Plant Records. N 3-2, Office Equipment (Works).

p. 395.
p. 432.

It is advisable to treat all office equipment as loose, and therefore as requiring an annual inventory, although some of the items such as shelving, electric light fittings and linoleum are of a fixed character, and would be subject to regular depreciation.

The equipment of all offices pertaining to the works administration, including drawing office and works accounts office, will be included here. The equipment in foremen's offices is better included under N 3-1 as portable shop accessories.

N 3-3, Office Equipment (General).

p. 493.

This account has reference to the equipment of all offices outside the works administration, for which the expenditure is dealt with in the works accounts.

Exhibition fittings can advantageously be included here as a sub-account.

Building and Fixed Plant Identification.

In the specimen classification, developed from the above grouping, given on the following pages, convenient class numbers have been evolved from the group numbers by using the group number to represent the hundreds figure and the class sequence in the group to represent the tens and units figure. Thus Accumulators, Hydraulic, appear as class 201 and Shaping Machines as class 987. This assumes that there will be no more than 99 classes in any one group, and this is a reasonable assumption for the majority of works.

The identification number for each item of a given class is derived from the sequence number as taken up in the plant register in conjunction with the class number, e.g. 215-1, 215-2, etc. A scheme of this sort helps in the allocation of costs, as the group number (or first figure of class number) corresponds with the standing order sequence numbers; thus repair costs on accumulator No. 201-1 will be allocated to standing order R 2-2, and repairs to shaping machine No. 987-21 to R 2-9.

p. 482.

p. 413.

When machines are liable to frequent change of position it is desirable to adopt a position no. independently of the machine no. and, by suitable cross indexing in the offices concerned, to use the position no. as adequate identification of the machine on all job records. The practice is specially valuable on plant stoppage reports for locating machines in large shops. These position nos. can be applied in the form of stencil plates to be hung in a prominent place over or near the respective machines.

Buildings & Fixed Plant—Specimen Classification.

**Building and
Fixed Plant
Identification**

1. Land and Buildings.

1. *Buildings—Substantial Brick, Reinforced Concrete, and Steel Framed*
When used for ordinary trades, e.g. Machine Shop
When used for destructive trades, e.g. Smithy.

2. *Buildings, Iron, Substantial.*
Ordinary trades.
Destructive trades.

3. *Buildings, Iron, Light.*

4. Chimney Shafts, Brick.

5. Chimney Shafts, Steel.

6. Drainage System.

7. Fencing

8. Floor Plates

9. Foundations for Machinery.

10. Ganntries for Cranes.

11. Land

12. Lightning Conductors

13. Railway and Tramway Tracks.

14. Roads

15. Sash Operating Apparatus.

16. Sign Boards

17. Wells, Artesian.

18. Wharves

2. Motive Power Plant.

1. Accumulators, Hydraulic.

2. Ash Handling Plant

3. Boilers, Lancashire Type.

4. Boilers, Horizontal.

5. Boilers, Water Tube

6. Boosters

7. Coal Handling Plant.

8. Compressors, Air

9. Compressors, Centrifugal.

10. Condensers, Evaporative

11. Condensers, Jet and Surface.

12. Cooling Towers

13. Draught Installation, Forced and Induced

14. Economisers, Fuel.

15. Ejectors

16. Engines, Blower and Pumping.

17. Engines, Gas and Oil

18. Engines, Portable.

19. Engines, Steam

20. Gas Producer Plant

21. Generators, Electric, Alternators

22. Generators, Continuous Current (Dynamoes).

23. Generators, Turbo.

24. Heaters, Feed Water.

25. Injectors

26. Motors, Electric.

27. Motor Stands.

28. Oil Fuel Apparatus.

29. Power Plant Pipes.

30. Pumps, Air.

31. Pumps, Centrifugal and Turbine.

32. Pumps, Hydraulic.

33. Pumps, Steam.

34. Steam Separators and Traps.

35. Stokers, Mechanical.

36. Superheaters.

37. Transformers and Converters.

38. Turbines, Steam.

39. Turbines, Water.

40. Water Cooling Plant.

41. Water Purifying and Softening Apparatus.

42. Water Towers.

43. Water Wheels.

3. Mechanical Transmission.

1. Chain Transmission.

2. Clutches.

3. Gearing, Toothed

4. Shafting (including Pulleys, Bearings and Supports).

4. Electrical Transmission.

1. Batteries, Storage.

2. Cables.

3. Switchboards, Distribution Boards and Fittings.

4. Bells and Signals.

5. Light, Wiring and Fittings.

6. Motor Rheostats and Switches.

7. Telephone Installation.

5. Pipe Transmission.

1. Blast Pipe Installation.

2. Blowers.

3. Dust Extracting Installation.

4. Fans, Blast.

5. Fans, Exhaust and Ventilating.

6. Fire Hydrants, Valves and Pipes.

7. Gas Lighting, High Pressure Installation.

8. Gas Mains, Meters, Tapping, and Valves.

9. Heating Pipes, Radiators and Valves.

10. Hydraulic Piping

11. Petroleum and Petrol Storage Installation

12. Soda Kettle Installation.

13. Sprinkler Installation.

14. Stms Installation.

15. Tanks

16. Ventilating and Exhausting Installation.

17. Water Supply Pipes and Connections.

6. Transportation Plant.

(Including Weighbridges.)

1. Conveying Machinery

2. Cranes, Jib and Travelling.

3. Cranes, Locomotive and Portable.

4. Hoists, Chain

5. Hoists, Pneumatic.

6. Lifting Magnets.

7. Laths

8. Locomotives.

9. Runways and Trolleys.

10. Shearlegs.

11. Stacking Machines (Packages).

12. Transporters.

13. Weighbridges.

14. Winches.

7. Shop Fixtures.

1. Benchings.

2. Bins.

3. Guards, Machinery and Belting.

4. Mess Room Appliances.

5. Partitioning, Metal.

6. Partitioning, Wood.

7. Racks, Hat and Coat.

8. Racks, Tool.

9. Shelving.

**Building and
Fixed Plant
Identification.**

Buildings & Fixed Plant—Specimen Classification, contd.

7. Shop Fixtures, contd.

10. Storage Fittings, Steel.
11. Storage Fittings, Wood.
12. Time Recorders and Racks.
13. Washing Appliances.

8. Special Process Plant.

1. Acetylene Gas Plant.
2. Brazing Plant.
3. Cupolas.
4. Furnaces, Annealing, Hardening and Tempering.
5. Furnaces, Electric.
6. Furnaces, Gas and Oil.
7. Furnaces, Welding.
8. Galvanising Plant.
9. Heating Machines.
10. Magnetic Separators.
11. Mortar Mills.
12. Muffles.
13. Oil Extractors.
14. Oil Heaters.
15. Pickling Vats.
16. Sand Blast Apparatus.
17. Sand Grinders and Mixers.
18. Screening Machines.
19. Smith's Forges and Hearths.
20. Stoves, Core.
21. Stoves, Enameiling and Japanning.
22. Tumbling Barrels.
23. Welding and Cutting Plant.

9. Machines.

1. Automatic Screw Machines, Bar.
2. Automatic Screw Machines, Chucking.
3. Belt Lacing Machines.
4. Bolt and Nut Machinery.
5. Boring Machines, Horizontal.
6. Boring Machines, Portable.
7. Boring and Turning Mills, Vertical.
8. Broaching Machines.
9. Bull Dozers.
10. Cam-cutting Machines.
11. Centering Machines.
12. Cutting-off Machines.
13. Draw Benches.
14. Drilling Machines, Multi-Spindle.
15. Drilling Machines, Portable.
16. Drilling Machines, Radial.
17. Drilling Machines, Sensitive.
18. Drilling Machines, Vertical.
19. Drop Stamps.
20. Engraving Machines.
21. Filing Machines.
22. Flanging Machines.
23. Forging Machines.
24. Gear Cutting Machines, Hobbling.
25. Gear Cutting Machines, Milling.
26. Gear Cutting Machines, Planing.
27. Grinders, Cutter.
28. Grinders, Cylindrical Plain.
29. Grinders, Disc.
30. Grinders, Drill.
31. Grinders, Internal.
32. Grinders, Saw.

9. Machines, contd.

33. Grinders, Surface.
34. Grinders, Tool, Wet.
35. Grinders, Universal.
36. Grinding and Polishing Heads.
37. Grindstone Troughs.
38. Hammers, Belt Driven.
39. Hammers, Drop.
40. Hammers, Pneumatic.
41. Hammers, Steam.
42. Hydraulic Machinery.
43. Key-seating Machines.
44. Lathes, Bench Precision.
45. Lathes, Boring and Facing.
46. Lathes, Brass Finishers.
47. Lathes, Capstan.
48. Lathes, Crankshaft.
49. Lathes, Eugene.
50. Lathes, Hand.
51. Lathes, Pulley.
52. Lathes, Relieving.
53. Lathes, Shaving.
54. Lathes, Turret, Horizontal.
55. Lathes, Turret, Vertical.
56. Lathes, Wood-working.
57. Marking Machines.
58. Milling Machines, Circular Forming.
59. Milling Machines, Hand.
60. Milling Machines, Horizontal, Plain and Lurch.
61. Milling Machines, Universal.
62. Milling Machines, Vertical and Slot.
63. Mocking Machines.
64. Paint Mills.
65. Pipe Bending Machines.
66. Pipe Cutting and Screwing Machines.
67. Plate Bending Machines.
68. Planing Machines, Parallel.
69. Planing Machines, Rotary.
70. Polishing Machinery.
71. Presses, Hydraulic.
72. Presses, Pneumatic.
73. Presses, Belt Driven.
74. Profiling Machines.
75. Punching Machines, Hydraulic.
76. Punching Machines, Belt Driven.
77. Punching and Shearing Machines, Steam.
78. Riveters, Pneumatic.
79. Riveters, Hydraulic.
80. Riveters, Steam.
81. Sawing Machines, Metal, Band.
82. Sawing Machines, Metal, Circular.
83. Sawing Machines, Metal, Hack.
84. Sawing Machines, Wood, Band.
85. Sawing Machines, Wood, Circular.
86. Saw Sharpening Machines.
87. Shaping Machines.
88. Shearing Machines, Rotary.
89. Sheet Metal Working Machinery.
90. Slotting Machines.
91. Slotting Machines, Portable.
92. Swaging Machines.
93. Tapping Machines.
94. Testing Machines.
95. Thread Milling Machines.
96. Thread Rolling Machines.
97. Welding Machines.
98. Woodworking Machinery.

**Treatment of
Capital
Expenditure.**

Only by knowing the costs of each and every capital addition does it become possible to criticise and control expenditure effectively and to determine how far it may be economical to make any item

in the works, instead of contracting for its supply by an outside firm. Separate plant orders should, therefore, be issued for each specific item. Treatment of
Capital
Expenditure.
F 96.

Another aspect is that of determining the real capital value of such additions for carrying forward at the end of the financial year as an asset. Each item can be intelligently reviewed if the individual costs are known, whereas a conglomeration of costs under some standing order—so usually the practice—defies criticism and capital assets may be, and frequently are, increased unwarrantably.

The standard by which capital additions should be tested before acceptance for the final accounts should be :

1. Their demonstrable existence.
2. Their intrinsic value.

This standard is such that its absolute attainment might quite easily cost more than the results are worth.

There is obviously a big field here for a combination of works management and accountancy skill to obtain a practical compromise, adapted to each works, sufficient to ensure financial stability, for, obviously, the swelling of capital assets by untraceable expenditure is financially unsound and yet cannot always be successfully resisted by the professional accountant when called upon to certify the year's balance sheet.

In these considerations of costs, an important and far-reaching question of policy is the inclusion or exclusion of oncost charges on capital additions carried out by the works itself. If the same work were done by an outside contractor, the cost would include not only oncost charges but a profit. Done within the works, there can be no question of profit, but oncosts are as much incidental to capital additions as to ordinary production.

Professional accountants favour exclusion of oncosts as a safeguard against over-valuation of specific items, and, perhaps, as a secret reservation against the passing of a total capital expenditure that is unsusceptible to complete physical proof and valuation.

The more logical course, and one making for more accurate costing all round, is to apply oncosts in their proper proportion to all capital additions, and then submit the respective items to intelligent criticism as to their intrinsic worth. This will mean writing back to works expenses appreciable sums, which must be provided for, as a contingency, when fixing production oncost rates. p. 497.

p. 410.
p. 563.

An all-important consideration in respect to capital expenditure is that of depreciation, with which may be coupled obsolescence. It is helpful to classify plant assets and apply appropriate deprecia-

Treatment of
Capital
Expenditure.

tion rates to each class. There is difficulty in discriminating as to individual plant items. Depreciation may be likened to human decay—medical treatment during life does not prevent ultimate decline or exactly postpone it, so repair expenditure does not obviate deterioration and ultimate obsolescence or lessen the necessity for provision for depreciation. Depreciation is conveniently computed as a constant percentage on remainder values, but may be taken as a constant percentage on original cost—the object of both methods being to reduce the book value to scrap value within the useful life of the plant. Usefulness is, however, sometimes only a cloak for inefficiency, hence the need for critical determination of obsolescence.

p. 419.

With the drastic alteration in money values, depreciation rates applied to pre-war plant on the basis of original cost will not produce a satisfactory result. The simplest remedy is to recast book values in the light of replacement values before applying the depreciation rate. This will give that greater sum for depreciation that is imperative if the use of present plant is not to be rated too cheaply in determining production oncosts. Again, if depreciation be considered as provision for the replacement of plant as it becomes worn out, then obviously the amount provided must be proportionately greater by reason of the low purchasing power of money.

p. 416.

Obsolescence, as it becomes apparent, may be dealt with as the extra depreciation required to bring the discarded item from its book value to its realisable value in the second-hand market.

These proposals may raise the spectre of the income tax surveyor. The point, however, is of less moment seeing, that in any case, the final accounts are always subject to some adjustment before being rendered to the surveyor—such items as income tax, loan and mortgage interest, donations, etc., being written back and the charge for depreciation and obsolescence settled by mutual arrangement with the surveyor. A file copy of the accounts as ultimately agreed with the surveyor is kept for reference but the accounts as shewn in the firm's books are not affected, and can, therefore, be kept in whatever detail may best suit the firm's requirements for their own financial control.

p. 467.

There are some classes of capital expenditure that do not lend themselves to treatment by individual items. In the case of drawings, patterns, jigs and special tools, these should be taken sectionally, that is, all the drawings, etc., pertaining to any one article or class of product. These sectional costs should be kept in any case for general commercial guidance. Where expenditure of this character is at all heavy, it may be wise to settle in conjunction with professional valuers the total values that may be carried forward.

To carry forward any values of this character is nearly parallel to capitalising goodwill and some strictly observed limit is desirable. Patent valuation offers very similar conditions.

When developments and experiments are treated as capital expenditure, similar precautions must be taken against exceeding reasonable limits for what at best is only a form of goodwill.

Loose plant is subject throughout the year to additions, which may prove to be only renewals or may not even last the year. Their asset value is a matter of annual inventory unless a safe arbitrary limit of total values can be adopted that is acceptable to the auditor. The rating of the inventory may proceed on the lines of replacement values less an agreed percentage for average wear in each class of loose plant.

p. 427.

The channel indicated on page 412 for the control of repair expenditure may be used for works additions, subject, of course, to the works manager's limits of authority in the matter and apart from purchases of plant directly requisitioned by the works manager or by the plant engineer under works manager's instructions.

By keeping tally week by week of all expenditure on works additions, both in the works and by purchase outside, and exercising continuous care in the matter himself and through his deputy, the works manager will know how he stands.

One result of the common difficulty of getting sanction for plant additions and renewals that involve purchasing, is that it is easier for the works manager to spend money inside the works than to get permission to buy plant outside. In consequence of this, and against his own judgment, the works manager is frequently compelled to waste money patching-up and using inefficient machinery.

This question of inefficient machinery is very important and frequently has too little consideration. The taking of long views would assuredly curtail the purchase of second-hand machinery, a practice so beloved by some types of management—of commercial rather than technical management.

Old machines are not necessarily unprofitable neither are all new machines necessarily efficient. The matter is one of the many in works management calling for a discriminating judgment, based on a proper understanding of machine efficiency—considered always in relation to local conditions.

In regard to the provision, by the cost accounting system, for adjusting valuation figures from year to year, the essential point is to regularise all expenditure pertaining to buildings and fixed plant so that not only can efficient control be exercised, but the scope and

Control of
Capital
Expenditure.

F 65.

**Control of
Capital
Expenditure.**

effect of each item of expenditure shall also be made clear and allocated accordingly.

It is difficult to avoid the conclusion that costing systems that are not subject to very much more consideration than is usual in this connection, will not give reliable figures as to the value of works capital additions. There will be inconsistency as to the treatment of renewals and there will be confusion when extensive alterations are made.

As a matter of fact, the net effect of works expenditure on capital values cannot be determined very definitely in advance, and the only safe way is to suspend judgment until the work is finished. The function of the cost accounts then becomes limited, to an extent, to providing the data for the final allocation of the costs of new work rather than to give, in the first instance, the requisite figures as to capital values.

p. 485. Even seemingly obvious additions should not be given a capital value without due consideration, and, this being so, the routine
F 56 is recommended of issuing plant orders for all works additions, renewals, alterations or improvements equally with repairs.

The individual costs under these orders can then be reviewed, by the works manager in consultation with the production estimator and the works accountant.

p. 407. The costs which it is considered should be treated as works capital additions should be submitted by the works manager to the managing director with the secretary or financial manager in attendance. The approved decisions will then be notified to the works accountant for final incorporation in the cost accounts and through that channel in the financial accounts.

The actual holding in suspense, as to final allocation, of plant order costs will not, in practice, involve very many orders, but the principle of scrutinising each item, before passing it as a capital addition, is entirely sound. This scrutiny should preferably be made on each fortnight's accounts as set out on the plant orders cost summary, while the facts of each case are clear in the works manager's
F 137. mind.

This routine should also obviate any risks attaching to the use of the term improvements. Improvements do not always, perhaps rarely, justify any increase in capital values. Their most usual effect is to postpone obsolescence, for which ordinary depreciation rates do not provide, and expenditure on improvements may, therefore, only be an alternative to writing down the capital value of the plant in question. To maintain the current book or capital value of a machine unchanged, after an improvement, may, as a matter of fact, even mean continuing some degree of over-valuation

when the current book value has had too little relation to the true value of the machine in its unimproved state.

Control of
Capital
Expenditure

Loose plant and office equipment being subject to valuation each year do not need to come under the above arrangements as to review of capital values, though the expenditure under the various heads for additions, renewals and repairs call equally for joint scrutiny on similar lines.

In the matter of plant that is discarded, care must be taken to correct the book values of the plant in the financial accounts.

p. 305.
p. 497.
p. 559.
p. 573.

The scrap value of discarded plant should obviously be credited to the capital values, and when the discarded plant is sold, this course is taken as a matter of course. A credit entry is made against the respective works capital additions standing order of an amount corresponding to the debit placed against the sales sundries order covering the sale of the plant.

Discarded plant is not always sold, and sometimes is utilised for repair purposes or incorporated in some new construction. This occurs particularly with dismantled buildings. To meet such cases a standing order for discarded plant stock values (U 3-5) is necessary, thus allowing the capital value of the plant generally to be reduced accordingly, and for the scrap values in question to be held in suspense pending the utilisation of the discarded plant.

If the unsold discarded plant is utilised, say, for a repair job, the plant order for the repair should be debited and the standing order for discarded plant stock values (U 3-5) credited. It may not, however, pay to follow very closely the utilisation of discarded plant, except of the bigger items.

At the end of the year any unsold discarded plant still in stock will be reported accordingly on the works accounts annual abstract, F 163, and the balance, if any, against the account (representing the discarded plant that has been utilised or disposed of without any account adjustment being made) must be transferred to the production oncosts supplementary account.

It will on occasion happen that when plant is discarded the capital value in the books will differ from the scrap value, and such difference is best dealt with as extra depreciation, a matter discussed further on page 416.

Apart from the data as to building and fixed plant items available from the cost accounts, it is convenient to keep an independent buildings and fixed plant register. In this register should be recorded the capital value of any additions and alterations, the inventory value whenever taken, and the book or remainder value at any date for which the figures may be desired. In the ordinary

F 145.

**Control of
Capital
Expenditure**

way, if flat depreciation rates are used, there is less occasion to make entries each year in the plant register in respect to the annual depreciation. By the use of the remainder value table given on page 420, one calculation will serve to give the remainder value after any term of years.

Touching the provision suggested for inventory value, it may be worth while, if a thorough works valuation at one time is out of the question, to value the plant by instalments. The location of the plant at the time of inventory may conveniently be indicated in the register. Individual items should always be re-valued whenever the location is altered.

**Control of
Repair
Expenditure.**

p. 478.

There is undoubted difficulty in controlling any class of works expenses when open accounts or standing orders are used by the shops, for the net effect of issuing a list of standing orders is to give carte blanche authority, from an accounting point of view, for any amount of expenditure by the shops under each or any of those orders. In practice the foreman's responsibility to the works manager means the exercise of some discretion in the amount of expenditure. The works manager's criticism, however, is apt to come after the event, while, if the periodical expenditure follows a normal average, no matter if really high, the works manager can hardly criticise it since he can rarely be in a position to say what it ought to have been. These remarks apply with special force to works repairs, the expenditure on which is so susceptible to judgment or discretion. The use of individual plant orders is, therefore, recommended to cover each repair just as in the case of additions.

F 96.

The exercise of the necessary control in a large works would presumably be effected through the plant engineer, who has general charge of the motive power and other plant. In smaller works the nearest approach to such an official will be the foreman millwright, but it is hardly likely that it could be right or expedient to place on him the responsibility for initiating orders for works repairs. Such a course might mean little improvement, if any, over the use of standing orders.

On the other hand it is important to arrange for the issue of plant stoppage reports without a moment's delay whenever production is interrupted on account of plant failures. These should emanate from the foreman of the department in which the stoppage occurs, and be made out in triplicate so that two copies can go to the foreman millwright and one to the works office for record and report to the works manager. This procedure aims at the promptest possible action while providing for all necessary investigation.

F 158.

The foreman millwright's copies can advantageously be printed in different colours, one in red and one in black. The red printed copy can be issued as an instruction to the mechanic concerned and the black printed copy for the foreman's reference. If a board is provided with suitable slots or pockets for each machine or position no. the plant stoppage reports can be placed therein and constitute a graphic index of machines down—an exposed record for inspection by the works manager on his daily round of the works.

**Control of
Repair
Expenditure.**
p. 404.

The foreman millwright's clerk can fill in, on the respective plant stoppage reports, the appropriate account reference for minor repairs and apply for a plant order for the larger repairs under instructions from the foreman.

p. 431.

Belting breakdowns come under this procedure with marked results in regard to greater efficiency.

Whatever arrangement is made for issuing plant orders—it is essential that the control be retained by the management.

This control may, perhaps, be achieved by the works manager authorising all plant orders, but if that means signing them only, he will get poor results. Firstly, in any but very small works, he will not always know precisely what he is passing, even supposing he is never forced by pressure of other work to sign without pretending to exercise any judgment. Secondly, if every repair must wait his authorisation, the delays may soon force him to drop this method of attempted control.

The works manager's best remedy in practice is to decide on a centralising point in the works, not in the offices, where plant orders can be issued on some predetermined plan.

p. 141.

The method of requisitioning for a plant order to be issued may be by means of a departmental memorandum or perhaps a foreman's requisition form, according to circumstances.

F 106.
F 159.

The point is that the works manager should select some one of the staff who is accessible at all factory hours, and put on him the responsibility of issuing plant orders and purchase requisitions, subject to the reference to the works manager of all orders likely to cost more than a certain amount, or as he may instruct. If this deputy has a reasonable amount of discretion no difficulty should arise over very urgent repairs. Generally the works manager will wish to be called to see these special cases so that even then his authorisation may be obtainable before work is started.

F 54.

Investigation beforehand of probable cost when considered necessary should be referred to the production estimator, as being qualified to estimate costs correctly and therefore unlikely to indulge in the optimistic estimates so common to foremen.

p. 312.

**Control of
Repair
Expenditure.**

The deputy should be required to keep a record of the estimated cost of each order issued and to report the total each week to the works manager. This will afford the means, not easily obtainable any other way, of regularising the expenditure in accordance with the activity in the factory.

It is almost a necessary condition of effective control to issue a quantity slip for each plant order restricting the materials that may be drawn for each job. The investigation this involves is necessary for estimating purposes, so that no extra expense is entailed.

When trade falls off it is the usual thing for the repair expenditure to be cut down as the first move in reducing expenses. It is not difficult to do this, however uneconomical it may prove in the long run, by delaying the proverbial stitch in time that will save nine.

There is no avoiding the necessity of reducing repair expenses in slack times, except for special cases of extensive overhaul approved by the directors. It therefore behoves the works manager to use such means of controlling his repair expenses as shall enable him to trim his sails without unnecessary loss of efficiency. If he knows
F 65. that all his repair expenditure is well spent on economical repairs and not boosted up by idle or semi-idle time booked for convenience against repairs—one common result of open orders in the shop—or by unprofitable repairs of a patching-up nature, when only an overhaul will meet the case, then he should not hesitate to maintain his repair expenditure at a proportionate level when the shops are busy and there is the output to pay for it.

The difficulty will be that repairs may absorb the use of machinery urgently wanted for production purposes, and this will entail consideration of whether the interests of output are best served by postponing repairs.

V K

DEPRECIATION AND VALUATION OF BUILDINGS AND PLANT

FROM an administrative point of view depreciation and prospective obsolescence of buildings and plant needs to be considered only as a decline in value. Depreciation
Provision.

It is however worth making clear that to charge for depreciation as an item of production oncosts does not by that step ensure the provision of a reserve fund for replacement. It does in effect provide that there shall be no profit recognised, or distributed, until after allowing for this depreciation charge. Arguing from that, if this depreciation provision is not disbursed by actually replacing discarded plant, it remains in the working capital of the business. It may, of course, be set aside as an actual cash reserve, but more often than not it is merged in the general resources and applied in any desired direction. It may even disappear through trading losses.

If the depreciation charge for plant bought previous to the War does not sufficiently provide for the fall in the current purchasing power of money, then the current production oncosts will be gratuitously lower than those of competitors using plant purchased later—giving a false idea of profit—and the depreciation provision will not be equal to the cost of replacement when that becomes necessary.

On these grounds the easiest method for determining the total sum to be allowed for depreciation under present day conditions is to recast the nominal book values of plant on the basis of replacement values rather than vary the rate or percentage of depreciation. This procedure will bring book values of pre-war plant on to a common plane with post-war plant.

It is not suggested that the capital values of plant as figuring in the balance sheet need be inflated over the actual cost, because of these conditions, though their value in terms of currency may have increased twofold or more.

Depreciation Rates.

Coming to the question of depreciation rates, this is a matter in respect to which each factory stands alone as to what are proper and adequate depreciation rates to apply.

Considerable discrimination can be used as to the depreciation rates applicable to particular items, if due regard is paid to all the facts of each case. From the financial accounting point of view, however, there is no ready alternative to the use of flat percentage rates, differentiated according to the general character of plant involved.

p. 400.

As previously indicated, buildings and fixed plant may be conveniently grouped as under, and flat rates applied to each group :

1. Buildings. (Land does not usually depreciate.)
2. Motive Power Plant.
3. Mechanical Transmission.
4. Electrical Transmission.
5. Pipe Transmission.
6. Transportation Plant.
7. Shop Fixtures.
8. Special Process Plant.
9. Machines.

These plant groupings are arranged to minimise the misleading effect of flat-rates. If the depreciation rates were further graded to suit each class of plant included in these groups, they would still fail to discriminate between the wear and tear of the different items in each class, due to different conditions of service and the varying endurance of different types and makes. There is, therefore, little encouragement to consider the increased accounting work necessary to carry out such an idea, although there need be no hesitation in admitting that there are considerable differences in the length of efficient life of various classes of machines that appear very similar, such, for instance, as automatic screw machines, capstan lathes and engine lathes, if they are used to their respective full capacity and therefore speed.

Only a few well-defined groups of plant values can be accepted in the financial books, not so much from a book-keeping point of view as from the all-important one of the decision to be arrived at by the directors regarding the depreciation rates to be used. The lines of treatment are, therefore, necessarily broad, to conform with the limitations common to all business enterprises.

p. 411
p. 416.
p. 558.

While the risk of obsolescence before plant is worn out may be a very serious one, it involves taking a rather too heroic course to depreciate speculatively on that account. The better compromise will be to reckon on dealing with the book value of each item of

plant as and when the occasion arises to replace it. Such difference as is found to exist between the book value and the value realisable by the sale of the discarded plant, may be considered as the balance of depreciation for which the annual rates have not provided. Depreciation Rates.

This difference or extra depreciation will require to be specially reported at the end of the year for incorporation in the financial accounts through the medium of the works accounts annual abstract. p. 574.

With the best part of the industrial world concentrating, if only because of increased wages costs, on economies in production, obsolescence of factory equipment tends to become increasingly rapid, while the stress of competition in the future will force general recognition of the fact even more than it does to-day.

These are considerations to be carefully weighed in fixing depreciation rates, and when in doubt the rate should be on the high side, as the lower the book value of any plant item, the more readily can directors sanction the substitution of improved plant.

In a factory run at high pressure, wear and tear must take place the more rapidly, and will call for an annual consideration of the depreciation to be provided above the normal rate adopted.

As bearing on the percentage rate to be adopted, the following quotation from the Board of Trade Report on the Position of the Engineering Trades after the War ¹ is of interest. p. 7.

As one reason against the drastic writing down of plant, several witnesses complained to us that the allowance for depreciation and wear and tear of machinery allowed by the Income Tax Commissioners was often less than 5 per cent. or in very exceptional cases, 7½ per cent. off the depreciated amount, whereas an allowance of 15 to 20 per cent. should be more properly made to adequately provide for proper depreciation. We agree that the first named percentages are far too low to be attributed to depreciation of plant in these progressive days where the frequent replacement of old plant by improved machinery is an essential of successful trade, and where the introduction of high speed steel has so largely increased the running speed and wear of machines. We consider that up to 10 per cent. for day use and up to 15 per cent. for day and night use, should be allowed by the Income Tax Commissioners if, in fact, such a charge is made in the books of the firm or company against its profits. This would encourage manufacturers to instal modern plant instead of endeavouring to compete with plant that has become obsolete. A reasonable depreciation upon workshop buildings should also be allowed. Though bricks and mortar may endure, the design, size and strength of factories may, in course of time, render them obsolete and unsuitable. Against this probability a prudent manufacturer necessarily provides a depreciation fund.

When the factory is built on leasehold land, the question of depreciation assumes a different aspect and calls for legal advice as to the sum to be provided over the period of the particular lease in question to counter-balance the expiration of values that legally pass on the determination of the lease, and to meet the

¹ Cd. 9073. Extract by permission of H.M. Stationery Office.

Depreciation
Rates.
p. 57.

cost of dilapidations or making good after occupation. This amortization, as it is called, of the lease, may be achieved by the payment of annual premiums under a suitable insurance policy.

The first stage in determining the depreciation rate must be the decision as to what average length of life should be assumed for the plant taken by groups. All theory is in favour of taking each individual item on its merits, but the labour involved is considerable, and not sufficient advantage accrues from the point of view of financial control.

In settling on the length of life, the question arises as to whether the profitable, efficient life shall be considered or the possible life up to the scrap value stage.

The works manager will be enabled after a works valuation on the lines discussed under that head on page 421, *et seq.*, to make important recommendations to the directors as to the proper rates of depreciation for individual items of plant, and from that basis the flat rate appropriate to each group as a whole.

It may be safely assumed that when plant ought to be discarded by the manufacturing shop as not sufficiently profitable, it will be still worth something more than scrap value to some jobbing shop.

A suitable policy in this respect is to assume that the book value of plant, when it has reached the end of its efficient life, will be 10 per cent. of its basis value (either original or replacement as currency question may determine). In other words, that 90 per cent. of its basis value has to be written off, that is, charged to works expenses, as depreciation during its profitable life. Obviously it will not happen that every machine is kept in work until it reaches the 10 per cent. limit, or that no machine will be found profitable after that limit is reached. Again, there is no reason why the same limit should apply to all classes of buildings and plant. An automatic screw machine might, for instance, be worth in the second-hand market, 25 per cent. of its basis value when it ceased to produce really high-class work at the maximum speed, and ought, on economic grounds, to be discarded.

There are two methods of computing annual depreciation rates which are invariably expressed in terms of percentage.

The first method is to take the percentage on the basis value, that is, to write off equal amounts each year.

Supposing, for instance, a machine of the basis value of £300 is considered to have an efficient life of 14 years after which it is estimated it will still be worth 10 per cent. of its basis value, i.e., £30. Then, under this system, £270 has to be written off in equal instalments over 14 years, i.e., £19 5s. 8½d. per annum, which is

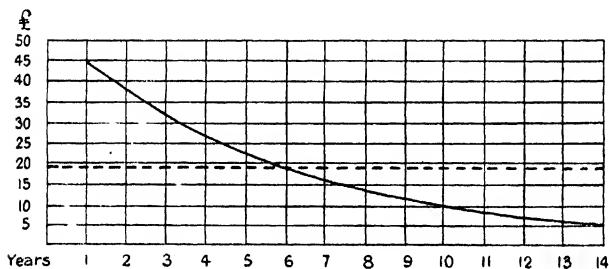
practically at the rate of $6\frac{1}{2}$ per cent. of its basis value. This method seems to be preferred in the United States of America. Depreciation Rates.

The second method, almost universal in this country, is to apply the percentage on diminishing values, e.g., a 15 per cent. rate would mean for a £300 machine depreciation, year by year, as follows :

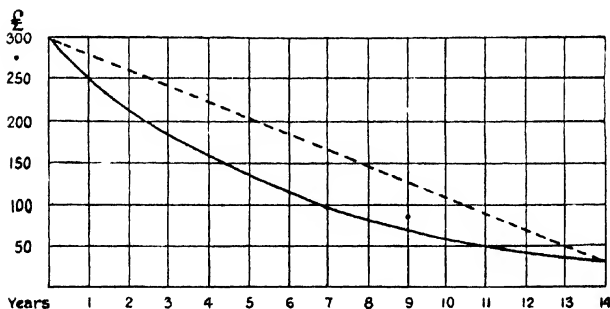
For 1st. year—15 per cent. on £300	=£45.
„ 2nd. „ „ „ 255	=£38 5s.
„ 3rd. „ „ „ 216 15s.	=£32 1s 3d.

etc., reducing the book value in 14 years to practically 10 per cent. of the basis value.

The following charts, based on the illustration given, shew the depreciation charges and declining book value year by year under the two systems—the equal instalment system or straight line method being shewn dotted, and the percentage-on-diminishing-value system in full line.



DEPRECIATION CALCULATIONS - Annual Charges



DEPRECIATION CALCULATIONS - Annual Decline in Book Values.

DEPRECIATION CALCULATIONS.
Comparison of Methods.

Depreciation
Rates.*Depreciation by percentage on Diminishing Values. Table of
Remainder Values expressed as percentage of Basis Value.*

Number of Years.	PERCENTAGE DEPRECIATION PER ANNUM.						
	5 percent.	6 percent.	7½ percent.	10 percent	12½ percent.	15 percent.	20 percent
1	95.00	94.00	92.50	90.00	87.50	85.00	80.00
2	90.25	88.36	85.56	81.00	76.56	72.25	64.00
3	85.74	83.06	79.15	72.90	66.99	61.41	51.20
4	81.45	78.07	73.21	65.61	58.62	52.20	40.96
5	77.38	73.39	67.72	59.05	51.29	44.37	32.77
6	73.51	68.99	62.64	53.14	44.88	37.71	26.21
7	69.83	64.85	57.94	47.83	39.27	32.06	20.97
8	66.34	60.96	53.60	43.05	34.36	27.25	16.78
9	63.02	57.30	49.58	38.74	30.07	23.16	13.42
10	59.87	53.86	45.86	34.87	26.31	19.69	10.74
10-3	—	—	—	—	—	—	10.00
11	56.88	50.63	42.42	31.38	23.02	16.73	—
12	54.04	47.59	39.24	28.24	20.14	14.22	—
13	51.33	44.74	36.29	25.42	17.62	12.09	—
14	48.77	42.05	33.57	22.88	15.42	10.28	—
14-2	—	—	—	—	—	10.00	—
15	46.33	39.53	31.05	20.59	13.49	—	—
16	44.01	37.16	28.73	18.53	11.81	—	—
17	41.81	34.93	26.57	16.68	10.33	—	—
17-3	—	—	—	—	10.00	—	—
18	39.72	32.83	24.58	15.01	—	—	—
19	37.74	30.86	22.73	13.51	—	—	—
20	35.85	29.01	21.03	12.16	—	—	—
21	34.06	27.27	19.45	10.94	—	—	—
21-9	—	—	—	10.00	—	—	—
22	32.35	25.63	17.99	—	—	—	—
23	30.74	24.10	16.64	—	—	—	—
24	29.20	22.65	15.40	—	—	—	—
25	27.74	21.29	14.24	—	—	—	—
26	26.35	20.01	13.17	—	—	—	—
27	25.03	18.81	12.18	—	—	—	—
28	23.78	17.68	11.27	—	—	—	—
29	22.59	16.62	10.43	—	—	—	—
29-5	—	—	10.00	—	—	—	—
30	21.46	15.63	—	—	—	—	—
31	20.39	14.69	—	—	—	—	—
32	19.37	13.81	—	—	—	—	—
33	18.40	12.98	—	—	—	—	—
34	17.48	12.20	—	—	—	—	—
35	16.61	11.47	—	—	—	—	—
36	15.78	10.78	—	—	—	—	—
37	14.99	10.13	—	—	—	—	—
37-2	—	10.00	—	—	—	—	—
38	14.24	—	—	—	—	—	—
39	13.53	—	—	—	—	—	—
40	12.85	—	—	—	—	—	—
41	12.21	—	—	—	—	—	—
42	11.60	—	—	—	—	—	—
43	11.02	—	—	—	—	—	—
44	10.47	—	—	—	—	—	—
44-9	10.00	—	—	—	—	—	—

Number of Years.	PERCENTAGE DEPRECIATION PER ANNUM.			
	25 percent.	30 percent	33½ percent.	40 percent
1	75.00	70.00	66.67	60.00
2	56.25	49.00	44.44	36.00
3	42.19	34.30	29.63	21.60
4	31.64	24.01	19.75	12.96
4-5	—	—	—	10.00
5	23.73	16.81	13.17	—
5-7	—	—	10.00	—
6	17.80	11.76	—	—
6-5	—	10.00	—	—
7	13.35	—	—	—
8	10.01	—	—	—
8-0	10.00	—	—	—

Refer p 423 for illustration of use of table.

The advantage claimed for the percentage on diminishing value system is that the heaviest burden of depreciation falls when the machine is at its maximum efficiency and when repair expenses are at their lowest. It is in practice very convenient and contains no pitfalls as to computing the proper total depreciation each year on total capital values.

From the table given on opposite page, it will be observed that the period necessary for any given percentage to reduce the basis value—to 10 per cent. of same—by a percentage on diminishing value, is as follows :

Per cent.	Years.	Per cent.	Years.
6	37.2	20	10.3
7½	29.5	25	8.0
10	21.9	30	6.5
12½	17.3	33½	5.7
15	14.2	40	4.5

The task of valuing the buildings and fixed plant of any works is not usually dealt with by the works staff, except to the extent of keeping careful accounts of expenditure and depreciation. When any occasion arises to necessitate a confirmation of the book values, professional valuers are usually called in and only their certificate is likely to be held valid in any financial transactions involving the plant values.

Without suggesting restrictions to the field of professional valuations, there will be, in any fully organised works, a need for a valuation to be carried out for works account purposes which, both economy and convenience suggest, should be done mainly by the works staff. With the post-war necessity of reviewing capital values in the light of altered currency values, this work becomes increasingly important, in view of its essential bearing on depreciation rates.

The usual difficulty in applying professional valuations to works account purposes is in the lack of detail figures from which departmental values can be derived. There are professional engineers who undertake the preparation of inventories and valuation of plant in full detail, but this course is not usual for valuations used for financial deals.

The professional report will include probably an excellent description of the items included in the valuation, but no values, except as to totals under a few main headings. The existence of complete plant accounts should influence the headings selected by the valuer and thus make his report of the more use for works accounts.

**Valuation of
Buildings and
Fixed Plant.**

In preparing for a works valuation, the works accounts should be previously organised on lines that will accord with those to be adopted in the inventory, and this will facilitate the adjustment of valuation afterwards, from year to year, with a minimum of further inventory.

The basis recommended for valuing purposes is the replacement value. The current or inventory value is then arrived at by depreciation according to the age of the item—the depreciation rate being settled in accordance with the probable efficient life of the class of plant in question.

It is not saying too much to state that the cost data of capital addition executed by the factory in years gone by is liable to be wrong, but, whether wrong or right, it is safer to value on the basis of what the buildings and plant are worth, rather than what they are purported to have cost. Another factor tending to prevent the use of cost data is that the classification adopted for a works valuation, on the lines discussed, is hardly likely to have been anticipated in the cost accounts of a much earlier date.

p. 400.

A yet further point is that the cost of alterations may have been added to the book value of the plant in the past without permanently increasing the real capital value. The replacement value basis will correct these inflations of book value so far as they may be wrong.

p. 485.

The use of replacement values gives a common ground of reference in criticising the ultimate inventory values, and furnishes also an important guide to the values to be covered under the fire insurance policies, for book values may be, if much written down, dangerously misleading. There is, too, the insistent question of the change in currency values making original pre-war costs quite misleading to-day. It might, of course, be agreed to accept as present day basis values double, or more, the pre-war original cost.

This would enable the available cost data to be consulted, if not accepted.

The generally accepted method of depreciation plant values is by a regular percentage deduction each year of life, from the diminishing value of the item, so that it is not quite a simple matter to calculate the total depreciation for a given number of years. For inventory purposes the reverse information has to be recorded, viz., the present or remainder value, and it is convenient to have reference tables showing the remainder values in terms of percentages of the original or reference value. The table on page 420 has been specially prepared for this purpose.

F 145.

The use of the table is fairly obvious, but an illustration may be useful.

**Valuation of
Buildings and
Fixed Plant.**

Suppose the basis value of a lathe, 14 years old at date of inventory, is £300 and the rate of depreciation $12\frac{1}{2}$ per cent. Turning to the tables, it will be seen that the remainder value after 14 years at $12\frac{1}{2}$ per cent. depreciation will be 15.42 per cent. of the basis value, that is, the inventory value of this lathe at the date of the inventory will be 15.42 per cent. of £300, which equals £46 2s. 8d.

The form of the inventory will need to be such as to give the departmental values under the respective group headings.

The application of these departmental values and item values for production oncosts purposes is discussed elsewhere.

p. 540.
p. 558.

The use of what may be termed approved basis values rather than unverified cost data, will by itself tend to a proportionately lower inventory value, particularly as regards installation values, because works labour of this sort is almost inevitably out of proportion to the tangible results, and only tangible results can be admitted in a valuation on the present lines.

Another, and possibly more influential factor in reducing inventory total values compared with book values, assuming same has been adjusted in regard to currency value, is the probable difference between the depreciation rates that a technically trained man acting as works valuer, with full cognisance of the facts, will use for inventory purposes, and those that will have obtained in connection with the financial accounts. The works manager, rather than the works valuer, will be required to take the responsibility for the depreciation rates used, but the works valuer will presumably be competent to recommend appropriate rates. The works manager will be able to test the suitability of the depreciation rates by noting a number of the inventory values and inspecting the plant in question to see what evidence is available to confirm the line taken.

A works valuation carried out efficiently on these lines will afford the only practicable method of testing the adequacy of the depreciation rates used in the financial accounts.

In the taking of the works inventory the acting works valuer should be very methodical and should have considerable technical experience, and beyond that, should give his whole time to it until the work is completed.

It will be a distinct aid if the works plans are previously brought thoroughly up to date. The preparation of proper works plans, giving not merely machine locations but also pipe service, lighting service systems, etc., is to be recommended for efficient administra-

**Valuation of
Buildings and
Fixed Plant.**

tion, apart from all questions of valuation—separate prints being used for each service system.

F 96. Incidentally the use of specific plant orders for all additions, renewals, alterations and removals makes it possible to keep the works plans up to date with trifling expense, providing there is a rigid application of such a system of detail orders.

The works valuer will rarely be qualified to deal with land and buildings as well as plant.

In the case of land, there is little alternative to calling in a professional land surveyor or valuer, and yet his report will probably contain so many qualifications that his personal judgment is really the deciding factor. It might not be difficult to get widely varying values from different surveyors. The surveyor's technical report on the land is likely to be of considerable permanent service, even if his judgment as to the land value be disputed.

In the matter of buildings, a skeleton inventory can be prepared and an architect with a fairly intimate knowledge of the site called in to give the replacement values or estimated cost of replacement of each building.

These replacement values should be compared with the data available as to original costs. If such data were always to be relied upon, the precaution of obtaining an independent estimate would be the less imperative. It is suggested that the current value of a building should be estimated by the process of depreciation of its replacement value.

The works valuer will find it of considerable help to have the services of a shorthand clerk to go round the works with him to take down particulars. The necessity of avoiding any mistakes in taking the inventory detail down will be obvious.

In the matter of certain groups of plant it will be much more satisfactory for the inventory to be taken in the first instance by those men whose business it is to keep the particular plant in order, providing that they are accompanied by the works valuer's clerk to take down the data in good order. The groups where this course will be desirable are as follows :

Mechanical Transmission (Millwright).
Electrical Transmission (Electrician).

Pipe Transmission (Pipe Fitter).
Shop Fixtures (Joiner).

In the above cases the inventory will be very much simplified, and the net results not the less satisfactory, if the practice is adopted, in estimating replacement values, of adding a margin to the material costs to cover installation and connections. It is necessary to go to a little trouble to see what this margin amounts to in typical instances of each class of plant. If the margin is expressed in terms of cost per foot run, etc., rather than as percentage of cost, in the case of

shafting, piping, wiring, etc., graded as to different sizes, the rate to be allowed will be more easily arrived at and more easily applied. Valuation of Buildings and Fixed Plant.

The operation of depreciation will steadily minimise any errors in arriving at replacement values, and the exercise of discretion in the method of taking the inventory of minor details of plant is the more admissible in consequence.

It is, however, quite easy to go a good deal wrong over details that are small in themselves, but occur so frequently as to account for a considerable value in the bulk.

In taking the inventory, the age of each item requires to be noted, and this should be obtained from the shop staff, if not available from official records. The opportunity should be taken of commenting on the probable further life of each item, more particularly as to the likelihood of early obsolescence or supersession by more modern plant.

The inventory data should be finally entered on the plant record F 64. cards.

In considering the valuation of loose plant, some regard must be paid to the financial view-point, for in different works diametrically opposite methods of valuation pass muster. In some cases, when the financial position is strong enough, no value whatever is placed on loose plant that has been put into use. In other cases, all loose plant is valued at cost, the argument being that so long as the items are good enough to use they are worth full value. Loose Plant Valuation.
p. 403.
p. 483.

The more general practice, and the one followed by professional valuers, is to value loose plant that has been put into use at rates distinctly below original cost. These rates are applied frequently on a weight basis. New unused tools are almost invariably valued at cost.

A professional valuer must necessarily follow the general lines of established custom, using his discretion in each case as to the actual valuation rates to be used. Without disputing the acceptability of professional valuers' figures when available, it is necessary for works purposes to proceed on lines that are more amenable to analytical confirmation.

The most satisfactory and straightforward method is to rate the loose plant items at the replacement value and then to take a proportion of that value for inventory purposes. The reason for adopting replacement values as the basis values is to ensure the right conception of real values. Before the War the original cost when known, might have been accepted as the replacement value,

**Loose Plant
Valuation.**

though with plant made in the works, the original cost may have exceeded the replacement value, while the reverse may have obtained in other cases. With the revolution in currency values, the only course affording any safety from gross inconsistencies is to use replacement values.

p. 538.

The use of replacement values as basis values throughout the inventory makes possible various useful statistics for administrative purposes, notably production oncosts, and also makes comparison possible from year to year, however much the inventory values may have been written down.

A conservative financial policy will aim at placing a minimum value on loose plant, as the break up price of same would be very small. Under such conditions the time will arrive when actual valuation of the loose plant each year is quite unnecessary, as being obviously above the certified value in the financial books. In such cases the departmental inventory may be reduced to such proportions as administrative control and economy may dictate.

One serious objection to using replacement values throughout might be the excessive trouble necessary in stocktaking to ensure the individual descriptions being correctly given. In many cases of loose plant, the only ready method of stocktaking is by weight, and although this method is sometimes abused, it must be admitted for some items that have not been bought by weight. In those cases the replacement values should be converted to a weight basis, and probably averaged to an extent. Average replacement values may have to be adopted in other cases to obviate undue refinement in stocktaking, though the lines suggested for taking stock of loose plant lend themselves to a reasonable accuracy of description that will allow replacement values to be readily applied with considerable precision.

p. 394.
p. 510.

One rather useful application of these basis values lies in the practicability of demonstrating the departmental consumption of loose plant. This possibility may be taken advantage of to the extent of allowing foremen to report their own stock, so long as they are not posted as to the comparison figures. If the departmental stocks are rated consistently each year on replacement values, and if the loose plant accounts, both additions and repairs, are kept under departmental heads, and these again under groups or classes of plant, the differences in terms of replacement value will give a very fair notion of what has actually taken place in each department.

Some recommendations are possible as to the groupings of loose plant calculated to serve the scheme proposed of appraising the plant on the basis of replacement value. It is, however, somewhat

risky to suggest the definite proportions to be taken of those basis values, because the physical conditions of the plant must influence the actual decision. Loose Plant Valuation.

In the following table the suggestions offered as to an inventory basis are by way of illustrating the scheme, and it must be borne in mind that a firm is at least at liberty to write down its loose plant to a breaking up price, which would be considerably less than the suggested formulas would give. p. 409.

LOOSE PLANT GROUPINGS.	POSSIBLE INVENTORY VALUATION BASIS.
1. Belting and Driving Ropes -	Replacement value, less 50 %.
2. Gauges and Mechanical Measuring Appliances—Standard	" " " 50 %.
3. Hand Tools—Engineers' -	" " " 25 %.
4. Holding Appliances for Cutting Tools - - - -	" " " 33⅓%.
5. Holding Appliances for Work	" " " 33⅓%.
6. Machining Tools - - -	" " " 33⅓%.
7. Ordinary Implements and Utensils - - - -	" " " 50 %.
8. Portable Mechanical Appliances - - - -	" " " 33⅓%.
9. Portable Shop Accessories -	" " " 33⅓%.
10. Special Trade Tools and Accessories - - - -	" " " 50 %.
11. Testing Gear - - - -	" " " 33⅓%.
12. Transportation, Lifting and Weighing Apparatus - -	" " " 33⅓%.

Subject to individual valuation of important items.

It may with justice be argued that, in those groups, where few renewals have taken place in the course of the year, the inventory values of the previous year will not have been maintained, and, therefore, that the valuation scheme suggested above may not be always satisfactory. When, therefore, there is evidence that the plant under review is identical in the main with the previous year's stock, a deduction should be made for depreciation, after arriving at the inventory values on the regular lines. It should be remembered

**Loose Plant
Valuation.**

that true average values may have been largely maintained by the elimination of the more worn items by scrapping during the course of the year. The comparison of the current inventory totals with the previous year's figures, in conjunction with the additions and renewals expenditure, will make this evident,

In settling the basis of inventory valuation to be adopted, it should be borne in mind that an actual inventory of stock in hand is under review, and that the wastage during the year does not enter into the question of inventory values, except as presumptive evidence that the average real value is being maintained.

F 143 For valuation purposes, and to facilitate tracing the more costly items in the inventory, a subsidiary set of loose plant rate cards should be kept for each class. It may hardly be necessary to keep separate cards for each department possessing a given class of tools.

Data collected for determining replacement values of old stock may conveniently be recorded on these cards, which, in being independent of the cost allocation accounts, will be available for inventory and reference purposes at all times.

The difficulty of discriminating with precision between additions and renewals will make it unsafe to place very much reliance on the totals of expenditure allocated as additions except as it can be confirmed by the annual inventory.

p. 403.

The inclusion of all belting and driving ropes in loose plant is not general practice, but is more satisfactory than charging the original belt for each machine to the cost of the installation, and charging all renewals to expense without recognising the peregrinations of belting in the course of its career. There are limits to tracing belts in their individual course, though much saving may result from the control exercised by statistics of this sort. It is sufficient from a works account point of view to record the existence of all belting available at the end of the year, whether running or lying idle, and this record will provide the necessary statistics of actual wastage during the year.

Other items of plant quite frequently included with machine values are attachments and accessories purchased with the machine. In the extreme case of a tool equipment, for instance, bought with a turret lathe, inclusion with the machine value is obviously a misleading practice, as the tools may disappear without any adjustment being made in the book value of the machine. There is the further question of depreciation, which is affected by combining loose plant with machine values. The course advocated is to consider as loose plant all attachments and accessories that are not integral parts of the machines, but are really extras that theoretically

could be used generally, although in practice such items as chucks **Loose Plant Valuation.** may only be used on the machine to which originally fitted. The machine numbers may appear on such items without interfering with their inclusion in loose plant.

Motor vehicles are included in loose plant (group 12—transportation apparatus) on the grounds that depreciation is so rapid, and possibly uncertain, that individual yearly valuations are required.

Locomotives, on the other hand, are treated as fixed transportation plant as being more amenable to an average rate of depreciation per annum.

p. 405.

Horses are included in loose transportation plant, and individual valuation should be based on a veterinary surgeon's report each year. Presumably, veterinary attendance during the year will be at a contract price per horse.

In view of the varied interpretation that may be placed on the group titles that have been suggested for loose plant, it is thought desirable to give a specimen list of items classified accordingly. **Loose Plant Classification.**

Loose Plant—Specimen Classification.

1. Belting and Driving Ropes.

1. Cotton Driving Ropes.
2. Main Drive Belts.
3. Machinery Belting, Canvas.
4. Machinery Belting, Leather.
5. Machinery Belting, Rawhide.

2. Gauges and Mechanical Measuring Appliances—Standard.

1. Bevels.
2. Calipers.
3. Compasses.
4. Dividers.
5. Gauges, Caliper and Snap.
6. Gauges, Cylindrical.
7. Gauges, Depth and Height.
8. Gauges, Length.
9. Gauges, Thread.
10. Gauges, Wire and Sheet.
11. Indicators, Measuring.
12. Levels.
13. Marking Out Tables.
14. Measuring Machines.
15. Verniers.
16. Plumb Bobs.
17. Protractors.
18. Rules, Standard and Contraction.
19. Scribing Blocks or Surface Gauges.
20. Squares.
21. Straight Edges.
22. Surface Plates.
23. Tapes, Measuring.
24. Test Bars.
25. Trammels.
26. Verniers.

3. Hand Tools—Engineers.

1. Belt Cutters.
2. Bolt Cutters.
3. Centres and Centring Punches.
4. Chisels.
5. Drill Braces, Breast.
6. Drill Braces, Ratchet.
7. Files and Rasps.
8. File Cards.
9. File Handles.
10. Hack Saws, Frames and Blades.
11. Hammers, Copper and Lead.
12. Hammers, Hand and Sledge.
13. Mallets.
14. Oilstones.
15. Pincers.
16. Pipe Cutters.
17. Pipe Wrenches.
18. Pliers and Wire Nippers.
19. Punches.
20. Reamers, Hand.
21. Scrapers.
22. Screwdrivers.
23. Screw Plates.
24. Spanners, Adjustable.
25. Spanners, Plain.
26. Stamps, Letter and Figure.
27. Stocks and Dies.
28. Stud Extractors and Stud Fixers.
29. Taps, Hand.
30. Tap Wrenches.
31. Tommy Bars.
32. Tube Cleaners.
33. Tube Expanders.
34. Wrenches, Pipe.

Loose Plant
Classification*Loose Plant—Specimen Classification, contd.***4. Holding Appliances for Cutting Tools.**

1. Arbors, Milling Cutter and Reamer.
2. Bars, Boring and Cutter.
3. Boring Heads.
4. Boring Tool Holders.
5. Chucks, Drill and Tool.
6. Collars for Arbors and Bars.
7. Press Tool Holders.
8. Sleeves, Taper.
9. Sockets, Taper.
10. Tapping Attachments.
11. Tool Holders for Bar Tools.
12. Tool Holders for Turrets.

5. Holding Appliances for work.

1. Angle Plates.
2. Balance Weights.
3. Bars and Sections.
4. Blocks, Packing.
5. Blocks, Vee.
6. Bolts, Nuts and Washers.
7. Chucks, Jaw.
8. Chucks, Magnetic.
9. Chucks, Plain and Ring.
10. Clamps and Cramps.
11. Collets, Spring.
12. Dividing Heads and Centres.
13. Dogs, Machine.
14. Drilling Posts and Knees.
15. Gripping Dies.
16. Lathe Carriers.
17. Lathe Centres.
18. Lathe Steadlers.
19. Mandrils, Expanding.
20. Mandrils, Plain.
21. Packing Pieces and Plates.
22. Screw Wedges.
23. Vices, Bench.
24. Vices, Hand.
25. Vices, Machine.
26. Vices, Pipe.
27. Vice Clamps.
28. Wedges.

6. Machining Tools.

1. Bar Tools (Lathe, Planers, etc.), Carbon Steel.
2. Bar Tools (Lathe, Planers, etc.), High Speed Steel.
3. Boring Tools, Lipped.
4. Broaches.
5. Centre Drills.
6. Chasers.
7. Counter Bores and Facing Tools.
8. Cutters, Flat (for Cutter Bars and Tool Holders).
9. Drills, Flat.
10. Drills, Twist.
11. Gear Cutters.
12. Grinding Wheels.
13. Grinding Wheel Dressers.
14. Knurling Tools.
15. Marking Rollers.
16. Milling Cutters, Formed.
17. Milling Cutters, Plain.
18. Press Tools.
19. Reamers, Machine.
20. Saws, Band.
21. Saws, Circular.
22. Screwing Dies.
23. Screwing Die Heads.
24. Taps, Machine.
25. Threading Tools.

7. Ordinary Implements and Utensils.

1. Baskets.
2. Bellows.
3. Brooms and Mops.
4. Brushes.
5. Buckets.
6. Canvas Covers.
7. Casks.
8. Crow bars.
9. Drip Cans.
10. Drums.
11. Filters, Oil.
12. Filters, Water.
13. Forks.
14. Funnels.
15. Goggles.
16. Ladders.
17. Lamps, Flare.
18. Lamps, Hand.
19. Long Arms.
20. Mats.
21. Measures, Liquid.
22. Nail Extractors.
23. Oil Bottles and Cans.
24. Oil Feeders.
25. Oil Skins.
26. Padlocks.
27. Paint Kettles.
28. Picks.
29. Poles, Hand.
30. Rakes.
31. Riddles.
32. Sacks.
33. Shovels.
34. Sieves.
35. Sign Markers.
36. Sponges.
37. Squeegees.
38. Stencils.
39. Steps.
40. Suds Tins.
41. Syringes.
42. Tarpaulins.
43. Torches, Electric.
44. Watering Cans.

8. Portable Mechanical Appliances.

1. Boring Apparatus.
2. Drills, Electric.
3. Flexible Shafts and Tools.
4. Grinders, Electric.
5. Pneumatic Hammers.
6. Presses, Arbor and Straightening.
7. Pumps, Lifting.

9. Portable Shop Accessories.

1. Ambulance Appliances.
2. Boards, Setting out.
3. Boards, Shop Print.
4. Boards, Tally.
5. Boshes.
6. Boxes.
7. Desks, Shop.
8. Fire Fighting Appliances.
9. Horses, Steel.
10. Hose.
11. Lockers, Workers'.
12. Mess Room Fittings.
13. Pans and Trays.
14. Planks.
15. Racks.
16. Screens and Barriers.
17. Stands, Hat and Coat.

*Loose Plant—Specimen Classification, contd.*Loose Plant
Classification.

18. Stands, Vice.
19. Stands, Wash.
20. Stands, Work and Tool.
21. Stools.
22. Tables.
23. Tool Boxes.
24. Tool Cupboards.
25. Trestles.

10. Special Trade Tools and Accessories.

- (a) Building—
 1. Sundry Tools and Accessories.
- (b) Electricians—
 1. Sundry Tools and Accessories.
- (c) Heat Process—
 1. Blow Lamps.
 2. Blow Pipes.
 3. Forges and Furnaces, Portable.
 4. Ladles.
 5. Melting Pots.
 6. Moulds, Ingot.
 7. Moulding Boxes.
 8. Pots, Hardening and Case Hardening.
 9. Soldering Irons and Bits.
 10. Sundry Tools and Accessories.
- [Pertaining to Copper-smiths, Foundries, Blacksmiths, Tinsmiths, etc.]
- (d) Metal-Working—
 1. Anvils.
 2. Blocks and Plates, Setting and Flanging.
 3. Caulking Tools.
 4. Crease Irons.
 5. Dollies.
 6. Drifts.
 7. Folders, Tinman's.
 8. Hammer Tools.
 9. Levelling Slabs.
 10. Mandrels, Tinman's.
 11. Rivetting Tools.
 12. Setts.
 13. Shears, Hand.
 14. Shears, Tinman's.
 15. Stakes.
 16. Stamping Dies.
 17. Sundry Tools and Accessories.
 18. Swages and Swage Blocks.
 19. Tongs.
- [Pertaining to Boiler-makers, Copper-smiths, Blacksmiths, Tinsmiths, etc.]
- (e) Painting—
 1. Brushes.
 2. Spraying Machines.
 3. Sundry Tools and Accessories.
- (f) Polishing—
 1. Bobs and Mops.
 2. Sundry Tools and Accessories.
- (g) Woodworking—
 1. Hand Tools.
 2. Machine Bits.
 3. Machine Knives.
 4. Saws, Band.
 5. Saws, Circular.
 6. Trimmers.
 7. Vices.

11. Testing Gear.

1. Ammeters.
2. Ballast Weights.
3. Barometers.
4. Calorimeters.
5. Cocks.
6. Counters.
7. Engine Indicators.
8. Flanges.
9. Galvanometers.
10. Hardness Testing Instruments.
11. Jointing Materials.
12. Manometers.
13. Ommeters.
14. Pipes.
15. Pressure Gauges.
16. Pumps, Portable Pressure.
17. Pyrometers.
18. Sahnometers.
19. Speedometers.
20. Springs.
21. Tachometers.
22. Thermometers.
23. Tubing, Rubber.
24. Tubing, Flexible Metallic.
25. Valves.
26. Volt Meters.
27. Watches, Stop.

12. Transportation, Lifting, and Weighing Apparatus.

1. Barrows.
2. Blocks, Chain.
3. Blocks and Falls, Rope.
4. Chains and Chain Slings.
5. Cords.
6. Crane Hooks and Shackles.
7. Hand Carts.
8. Horses.
9. Horse Carts and Vans.
10. Jacks, Hydraulic.
11. Jacks, Screw.
12. Lifting Dogs.
13. Lifting Screws.
14. Motor Cars.
15. Motor Vans.
16. Packing Cases.
17. Ropes, Hemp and Manilla.
18. Ropes, Wire.
19. Scales and Balances.
20. Steam Wagons.
21. Tongs, Lifting.
22. Tongs, Timber.
23. Trolleys, Hand Sack.
24. Trolleys, Flat.
25. Trucks and Wagons.
26. Weighing Machines, Counter.
27. Weighing Machines, Crane.
28. Weighing Machines, Platform.

It is suggested that a classification list on the lines indicated above, adapted to the works in question, should be prepared, and revised editions issued each year to the departmental foremen and

Loose Plant
Classification.
F 143.

others for guidance at stocktaking. For this purpose it is important that the character of information required for valuation purposes, in respect to each class, should be indicated on the list. The following gives the range of data likely to be called for :

Weight - - - - -	Wt.	Material - - - - -	Ml.
Number or quantity - - - - -	No.	Maker's Mark or Nominal Size - - - - -	Mk.
Individual description - - - - -	De.	Maker's or Supplier's Name - - - - -	Mr.
Length - - - - -	Ln.	Principal Sizes - - - - -	Sz.

Abbreviations of the sort given are more readily remembered than single symbol letters.

For reference purposes generally it will be found distinctly advantageous to number the classes. Class numbers may be conveniently derived by combining the group number with the sequence number in the group as 1/4, 2/12, etc., and this will help cost allocation when the combined group and item number is quoted

F 59 on the tool orders.

Office
Equipment
Classification
p. 464.
p. 483.

A specimen list of office equipment items is appended. There are no group titles to be amplified, as the subdivision possible under office fittings, office furniture, and office accessories rarely calls for grouping.

Office Equipment—Specimen Classification.

- | | |
|-------------------------------------|---------------------------------------|
| 1. Book Cases and Cupboards. | 22. Letter Opening Machines. |
| 2. Books, Ready Reckoners. | 23. Maps. |
| 3. Books, Technical Reference. | 24. Minor Office Accessories. |
| 4. Books, Trade Reference. | 25. Models and Samples for Exhibition |
| 5. Calculating Machines. | Purposes. |
| 6. Card Cabinets. | 26. Numbering Machines. |
| 7. Chairs and Stools. | 27. Photo Printing Machines. |
| 8. Cheque Perforators. | 28. Picture Frames. |
| 9. Clocks. | 29. Portable Fans. |
| 10. Coin Sorting Apparatus. | 30. Safes and Cash Boxes. |
| 11. Copying Apparatus. | 31. Scales. |
| 12. Desks. | 32. Show Fittings. |
| 13. Dictating Machines. | 33. Slide Rules. |
| 14. Drafting Machines. | 34. Stamp Affixing Machines. |
| 15. Drawing Boards and Tee Squares. | 35. Surveying Instruments. |
| 16. Drawing Cases. | 36. Tables. |
| 17. Drawing Instruments. | 37. Tabulating Machines. |
| 18. Drawing Tables. | 38. Typewriters. |
| 19. Duplicators. | 39. Watchmen's Toll Tapes. |
| 20. Filing Appliances. | 40. Writing Utensils. |
| 21. Floor Covering. | |

WORKS ACCOUNTING

VI

COST ACCOUNTS

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VI A

COST ACCOUNTS—GENERAL PRINCIPLES

THE subject of cost accounting has always been important although this fact has only been but partially recognised. Its importance before the war rested almost entirely on commercial and technical grounds, but to-day its importance is greatly increased by the new conditions of industry and the necessity for frank collaboration of Capital and Labour.

The real costs of production must be discovered if, on the one hand, there is to be a permanently satisfactory relationship between employers and employed and if, on the other, competition in trade, national and international, is to be successfully met.

The purpose to be served by a proper system of cost accounts can be described as four fold, as set out in the author's small book on "The Costing Problem.

Industrial, for discussing wages rates, and establishing industrial co-ordination.

Technical, for demonstrating production efficiency.

Commercial, for fixing selling prices.

Financial, for furnishing interim stock and work in progress values.

It has already been pointed out that cost accounts are necessarily derived from administration records, and that these two separate and distinct factors go to make up the field of works or factory accounting. This dual constitution has been largely overlooked, and the term cost accounting, costing, costkeeping, or costfinding, has been used as if it embraced the whole subject, instead of being the superstructure only, or interpretation in financial terms of the basic facts pertaining to production.

There have thus been very serious flaws in the advocacy of better works accounting, on the one hand, through the concentration on the accountancy or commercial and financial aspects and, on the

Purpose of
Cost
Accounts.

Responsibility
for Cost
Accounts.

p. 17.

p. 18.

**Responsibility
for Cost
Accounts.**

other, through the neglect of the proper functions of the technical management in regard to the administrative records, by which alone a cost system has its being and for which the responsibility of the technical management should be obvious.

Works expenditure as a whole may be said to arise out of one or other of the following factors :

- Numbers employed, rates of wages, and time worked.
- Work done by each worker—its quality and quantity.
- Extra pay arising out of payment by results.
- Consumption of material.
- Auxiliary expenses.
- Capital expenditure.

It is not necessary to attempt a precise list so long as the point can be accepted that the works manager is responsible for this expenditure and therefore should be called on to give an account of his stewardship.

The widespread ignorance of the essential principles of cost accounting and the consequent lack of interest by technical managers has usually thrown on the financial department—represented by the company secretary and accountant—the duty of preparing the accounts of works expenditure unaided.

The financial department is necessarily without the technical knowledge or opportunity to do other than accept as accurate whatever administrative records are available or can be obtained and then to apply them to costing purposes as intelligently as possible—limited always by the lack of technical appreciation of the facts which the figures are intended to portray.

In some concerns, the policy is tolerated of the financial department, as such, imposing on the works management a costing system that is aimed at pointing out the path that the works manager shall tread to arrive at greater efficiency. The policy is thoroughly unsound ; the solution of works management must come from within and not from without.

Although a clear enough line can be drawn between administrative records and cost accounts, it is entirely desirable to have one official in charge of both—called therefore works accountant rather than cost accountant. The department is consequently referred to in this book as *the works accounts office*, with jurisdiction over timekeeping and wages, rather than as the cost department.

The relation of the works accountant to the works manager is discussed on page 20 under the heading of Staff Organisation, and the recommendations for direct responsibility of the

works accountant to the works manager are embodied in the staff diagram, given as a frontispiece. It is essential, of course, and recognised in this diagram, that the cost accounts as such, must be subject to the requirements and scrutiny of the financial accountant.

**Responsibility
for Cost
Accounts.**

The works accounts office becomes an essential element in works management and administration and the expenses attaching thereto should be charged under that head. It serves no good purpose to allow the impression to be formed that the expense of keeping the works accounts is one that can properly be criticised apart from the other administrative and clerical expenses of the works. It is very desirable too, that expenses of this character should be grouped for comparison with the trading margin, or works profit, because that is the criterion of the works success, and if an increase in administrative expenses can be shown to bring about an increase in works profit, it becomes much easier for the ordinary commercially trained director to appreciate that expenditure to obtain efficient administration pays. He is, however, not unlikely to consider that the credit for increased profits is due to the handling of the commercial side of the business or to trade conditions, and he is likely to be partly right, for slackness of trade, impossible contracts, or a vacillating selling policy will quickly drown all account evidence of works efficiency. This means that the works manager's self-interest is involved in the commercial efficiency of a business, if he has any ambition for the works efficiency to become evident.

p. 486.

The works manager must bear in mind that in striving to achieve works efficiency, he must at the same time have both tact and patience. He must cultivate the means to bring the desirability of his aims and methods before the directors so that they will give him their support willingly and fully. A proper system of works accounts will help his cause under all conditions, though some conditions are very discouraging.

With the works accountant carrying the twofold duties mentioned above, he should preferably have both technical and accountancy training. This is asking for more than is, ordinarily feasible, and aptitude or training in both directions is very unlikely to be possessed by the same person. The conditions, generally, almost compel the appointment of an accountant, and the better his training in his profession, the better works accountant he ought to make. While the works accountant may rarely be a technician, he must necessarily acquire a good deal of trade knowledge; his success will depend largely on his ability to learn much and yet retain a sense of pro-

**Functions of
Works
Accountant.**

**Functions of
Works
Accountant.**

portion, and not mistake familiarity with manufacturing conditions for technical knowledge.

Leaving to one side the call for trade knowledge, the functions of a works accountant may reasonably be set out as covering the undermentioned responsibilities—all as set out in "The Costing Problem" above mentioned.

Material.

(a) That all purchases shall be based on properly authorised requisitions, stating the purpose for which the goods are required.

(b) That exact records shall be made of all goods received.

(c) That no invoices shall be passed for payment except for goods properly ordered and received in good condition and correct to specification.

(d) That vouchers from responsible persons shall be required for all goods issued to the workshops, irrespective of whether the goods were specially purchased for a given job or purchased for stock.

(e) That the quantities and values of goods issued conform to the estimate or bill of quantities, when laid down beforehand, and alternatively be subject to technical investigation.

(f) That the vouchers for goods issued, in whatever form, shall furnish sufficient information to enable the cost of the goods to be allocated to the correct account.

(g) That quantity and value records of stores receipts and issues shall be kept so as to furnish a continuous inventory, which shall be tested at frequent intervals by actual stock checking of selected items, apart from an annual stocktaking.

(h) That materials passed to the shops in bulk for detail issue within the shop shall be dealt with through a sub-store and proper account kept of the ultimate disposal. Timber sent to the carpenters' shop, and bar steel to smithy are typical cases.

(i) That the comparisons of costs with estimates shall be kept by process, component or order, as may be required by the management.

(k) That auxiliary or indirect material costs—that is, all material that does not enter directly into the product—shall be analysed by departments and processes, in accordance with the requirements of the management for administration purposes.

(l) That all items of loose plant passed into shop service shall be kept under survey and proper control exercised under the instruction of the management as to their loan to the operators, the records necessary to this end being utilised for annual inventory purposes, subject to verification.

(m) That proper track shall be kept of each item of fixed plant, and provision made for recording its depreciation and obsolescence as reported on by the management.

Wages.

(a) That all engagements shall be properly authorised by the management, and the rates of pay duly authorised in each instance.

(b) That employment records shall be kept as to trade, department, dates of starting and leaving, and any intermediate changes.

(c) That accurate records shall be kept of employees' attendance (*i.e.* timekeeping) as constituting the basis for computation of time wages.

(d) That all overtime and working at exceptional hours shall be authorised.

(e) That records shall be kept of each employee's work as to time spent on each job, according to methods laid down by the management, and reasonably acceptable both to foreman and workers.

(f) That the job references to which time is booked shall be in line on the one hand with the management's scheme for instructing the shops as to the work to be done, and on the other hand with the scheme adopted for analysing works expenditure.

(g) That certificates shall be furnished, preferably by independent shop inspectors or viewers, of the amount of work done by each employee on manufacturing or productive operations, the certificates to show how much was accepted as correct, also how much was unacceptable, on what grounds, and at what stage of manufacture.

(h) That comparative data shall be kept of shop performances by operations and by individuals as may be desired by the management.

(i) That where payment is made on results, as in piecework and premium systems, the payment shall be accurately com-

**Functions of
Works
Accountant.**

puted from the viewing certificates (g) according to the authorised job rate.

(k) That where two or more operators are associated on the same piecework or premium job, the share of each member of the group shall be separately computed and paid direct.

(l) That wages having been computed accurately shall be made up accurately and paid out to the correct person.

(m) That the extra pay, or balance of earnings, due to payment by results, over the guaranteed time wages, shall be separately recorded, and statistics furnished accordingly to the management as to departmental, and, if required, individual piecework or premium efficiencies.

(n) That departmental records shall be kept of wages expended against wages value of output so as to establish departmental output efficiency statistics.

(p) That separate records shall be kept of direct and secondary wages expenditure on manufacturing processes—direct wages referring to actual operations on machine or bench, and secondary wages to associated help, notably supervision, inspection or viewing, and personal assistance, distinction being also made throughout as to overtime allowances.

(q) That the direct wages cost records shall give the time taken equally with the wages expended or incurred so as to provide a time basis for the application of production oncosts.

(r) That means of continuous comparison shall be established between estimated wages costs and actual wages costs—also as between previous wages costs and current wages cost. Or, alternatively, according to the instructions of the management, on the basis of time taken instead of wages cost.

(s) That the comparisons with estimates shall be kept by operation, process, component, or order, as may be required by the management.

(t) That auxiliary or indirect wages costs, that is, all other than direct or secondary costs, shall be analysed by departments and processes, in accordance with the requirements of the management for administrative purposes.

**General
Scheme of
Cost
Accounts.**

Costs that can be directly allocated to production orders are commonly known as prime costs—whether of materials, disbursements or wages.

The costs that cannot be directly allocated to production are first allocated to expense and then distributed in some proper manner as oncosts.

General
Scheme of
Cost
Accounts.

The constitution of oncosts and their proper distribution to the various products is the very essence of cost accounting and it is here that so much ignorance exists.

p. 528.

The not uncommon attitude of the ordinary business man is that indirect costs or oncosts are only of interest as requiring some mental provision when fixing a selling price. He recognises well enough that the oncosts must be met, but if the "blend" of business comes out right, he does not mind on what work or classes of work these are recovered.

This reliance on the blend is well enough from a merchant's point of view, for the merchant has only commercial expenses to provide for, and if he averages these on his turnover, he puts himself in a position to know fairly well what business pays him and what does not. Of course, different lines of business may involve unequal selling expenses, but a shrewd man can tell his real margin of profit near enough for practical purposes as long as he knows what the goods will cost him, and has only to discriminate in regard to his commercial oncosts. In the engineering trades, for instance, these probably average about ten per cent. of the turnover.

A manufacturer ought therefore to know what the goods really cost him in the sense that the merchant knows.

This means the separation of commercial oncosts from manufacturing or production oncosts and this differentiation will be found to have a far-reaching effect in the control of both.

p. 530.
p. 566.

There are works to-day in this country which are overburdened with commercial expenses, and separating the expenses should result in a sounder view of what constitutes manufacturing efficiency. It is symptomatic of the view-point of many directorates that the salaries of responsible production officials average much less than those of responsible commercial officials.

It is a primary necessity of a satisfactory system of cost accounts that there shall be entire agreement with the financial accounts.

p. 567.

From the point of view of the financial accounts the matter is one of expenditure by and on behalf of the works, of which the works accounts office must render a full return, dissected to meet the requirements of the financial accounts.

These requirements are regulated mainly by the accepted standards adopted by auditors and approved by the commercial community.

There is none the less room for considerable divergence of treatment even within these limits, and therefore it is imperative to give consideration to the particular system of financial accounts

**General
Scheme of
Cost
Accounts.**

in use before the cost accounts are tackled in any scheme of reorganisation. It is this aspect of the case that explains why costing systems are more commonly organised from the accountancy point of view than from the administrative one.

The system of cost accounts to be described has been devised so as to be adequately controlled, in the bookkeeping sense, by the financial accounts—a consideration which is apt to be overlooked by works managers whose interests are centred in production efficiency, and therefore aim to have their costing methods serve that end, rather than to facilitate accountancy efficiency. It is shown how the requirements of both parties can be met, and this should strengthen the hand of those managers who find some established system of financial accounts to be a stumbling block in the path of progress.

It is the function of cost accounts to account for the entire works expenditure in detail appropriate to the particular requirements of each manufacturer.

p. 452.
p. 459.

It is convenient that, apart from the records in the financial books of purchases, disbursements and wages, there shall be a master record in the works accounts office aggregating all the items of expenditure, to be accounted for, under heads adapted to a proper system of cost accounts. The rulings given in Section VII C for the works accounts register—called in the earlier editions the works expenditure book—are designed to that end.

F 115, 116, 117.

Cost accounting, as a bookkeeping routine, resolves itself into two distinct stages of *Cost Allocation* and *Cost Returns* or Summaries.

p. 12.

Cost allocation is, briefly, the dissection of works expenditure according to the respective orders concerned. These may be production orders for saleable product or standing orders for works additions or expenses. There may be any degree of sub-division under those broad heads as local circumstances dictate. Production of saleable product may be for stock, in the first instance, or may be special to individual sales orders. Sales orders for stock products may be considered as despatch orders and be charged with the finished products in question at an inclusive cost corresponding with the stock value.

p. 320.

Cost allocation is considered at length in Section VI B, page 449, and cost returns in Section VI C, page 565.

In the diagram given on page 444, the main stages in cost accounting are indicated.

Taking the diagram from the top :

- 1st. For financial accounting purposes all works expenditure is recorded under one or other of the following accounts :

Works Materials. Suspense Account (Purchases and Works Products).

General
Scheme of
Cost
Accounts.

Works Disbursements Suspense Account.

Works Wages Suspense Account.

The items are further aggregated in the works account register, as explained on page 452. The cost accounting system has to deal with this expenditure in its entirety, either by reporting its allocation to production costs or as being represented by an increase in stock values.

- 2nd. By the process of *initial cost allocation* the works expenditure is dissected under : p. 450.

Prime Cost { Materials.
Disbursements.
Wages.

Works expenses.

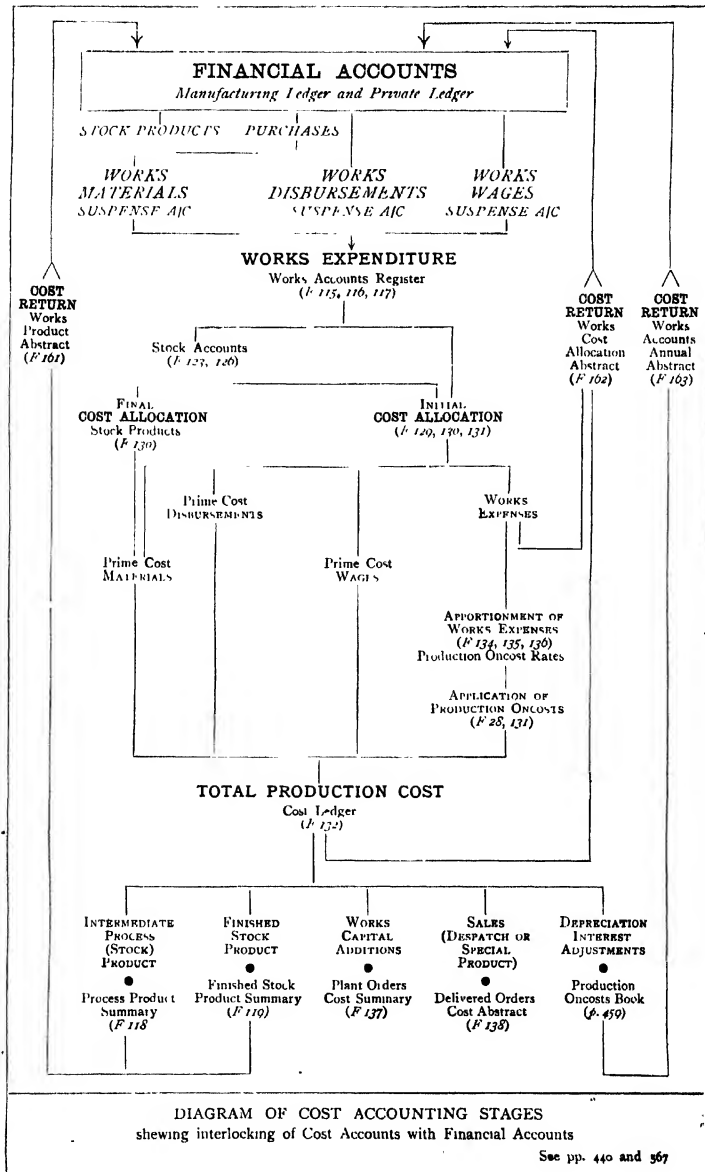
The prime cost materials may in part, or wholly, pass through stock accounts, but this does not affect the principle of initial allocation.

- 3rd. Works expenses are in total first *apportioned* to producing departments or producing units, and then *distributed* as production oncosts over the production. As indicated in the diagram, the initial cost allocation to works expense accounts is reported for financial account purposes through the works cost allocation abstract.

- 4th. Total production costs may, in addition to production orders, have reference to either intermediate process product or finished stock product which is passed into stock, and from the financial accounting view-point becomes works materials in suspense, through the medium of a *works product abstract* and when issued from stock becomes subject to *final allocation* to a production order as materials.

- 5th. The *total production costs* are derived from the processes of initial and final allocation, and have two principal applications.

Firstly, from the *cost ledger* under the individual production order reference the costs are reported for administrative and commercial purposes, on a *delivered orders cost abstract*. The specimen form F 138 (Section VII c) provides for comparison of total production or works cost, with sale invoice price, to shew what trading margin exists to meet commercial oncosts and provide profit.



Secondly, the total production costs are incorporated in the financial accounts, through the medium of the *works cost allocation abstracts*.

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Scheme of
Cost
Accounts.
F 162.

In conjunction with the *works accounts annual abstract*, as to stock adjustments, etc., the circle of cost accounts is completed, and works expenditure, as originally held in suspense in the financial books, is entirely accounted for.

F 163.

The art of costing is essentially one of close approximations rather than the collection of absolute facts. Perhaps material purchase costs will seem absolute enough, but when the material is issued in detail to the shops, there will be a proportion of material wasted, and quite often unavoidable errors in allocation as to quantity or price. With proper organisation there will be small scope for waste, but there will even then be some margin of material issued that does not go into the article produced. Further, taking the swarf, or turnings and drillings—in the case of iron and steel their value is so small that to ignore that value does not make much difference to the true material cost, but when gun-metal or other expensive alloys are in question, then the value of the swarf may be substantial. With some classes of work, such as ships' repairs, the value allowed in the estimate for the swarf recovered may make all the difference in obtaining orders.

Approxima-
tion in Cost
Accounting.

However precisely the net quantities of materials are obtained, there will be a call for judgment in the rates to be charged in the costs. There will be the actual purchase cost when the origin of the material is known, there will be the average purchase cost of material from stock, and the current market price of the material in question to choose from. None of these rates stand unquestionably as the true cost in the academic sense of the word true, but either one may be held to be the correct cost, or a sufficiently close approximation for all practical purposes.

Turning to wages costs, until men become absolutely automatic machines and administration is perfected in the last degree, there can be no guarantee of the absolute accuracy of the time allocated to a given job.

Some administrations place unwarranted faith in the infallibility of a time recorder stamping, because the men are supposed to clock "OFF" at the moment of finishing one job, and to clock "ON" at the moment of commencing another job. What happens in practice is that the man clocks "OFF" the finished job just when and not until he is ready to clock "ON" his new job. This is sometimes taken as implying accuracy in time recording, whereas such accuracy

p. 347.

Approximation in Cost Accounting.

as it does possess is an accuracy in time allocation considered merely from an accounting point of view. Those systems that provide for the time lost between jobs being charged up to a special account neglect the human nature of most foremen—on the other hand under a system of payments by results the workers, if compelled to wait, will be entitled to an allowance. This aspect is discussed on page 491 under standing order S6-6 for unproductive and waiting time.

A costing system by itself cannot prevent all waste of time, and waste prevention is the special function of administration. Any waste time that is included in the direct wages costs obviously detracts from the accuracy of the cost records, and leaves them as an approximation to the truth, just as near or as far as that particular aspect of the administration is efficient or inefficient.

The wasted time and errors in booking time that may be cloaked by a mechanical time recording system are usually far less than when time recorders are not used, though efficiency in this respect is not inseparably bound up with clocking methods.

As to mathematical accuracy in the distribution of production oncosts this is obviously impossible, but it is in this field that so much return is yielded by analytical investigation of the approximately true incidence of expense.

Cost Account Periods.

The determination of the periods that shall be used in the cost accounts is one to be made in accordance with the use to which the accounts will be put.

The advantage of a common period of accounts will be recognised.

It is quite usual in cost accounts for the wages allocation to be kept in periods corresponding with the wages payments, that is, by weeks, and for the material allocation to be kept in accordance with purchase accounts, that is, by calendar months. This is the line of least resistance, but the supreme objection is that the use of cost returns for administrative purposes then becomes very limited indeed.

Where the principle of a common period for cost accounts is accepted, it is not unusual to adopt two periods of four weeks and one of five weeks, thus at each quarter end agreeing with the calendar.

To adopt a uniform "month" of four weeks means losing touch with the calendar all the year round, whereas to adopt a fortnight as the cost account period ensures synchronising with the calendar at the half-year when it is highly important to prepare an approximate profit and loss account for the six months.

The fortnightly period gives the requisite uniformity for purposes of comparison, and while the period is short for some comparisons. it is quite long enough for adequate administrative control of expenses. The more important comparisons, or returns, as they may be called, while they may be made up each fortnight, derive their value by what they disclose as to the net position to date, coupled with the tendency at the moment as indicated by comparison of the latest fortnight's return with preceding ones.

Cost
Account
Periods.

Apart from administrative uses of the cost accounts, the shorter the account period the easier it is to agree the cost allocation accounts. This consideration is a vital one, and costing systems that do not provide for a strict agreement between expenditure and allocation are unreliable. They may be better than no system at all, because capable, conscientious cost clerks can be found, and in such hands some useful figures may be obtained, even though it be impossible to verify the figures with any exactitude.

Obviously a cost accounts system that is to agree with the financial accounts, which are subject to such complete auditing, should prove its accuracy as it goes along. From this point of view a fortnight is a convenient period.

The most serious objection that can be urged against fortnightly agreement of the cost accounts is the trouble and expense of tabulating the figures for obtaining the necessary totals, in the mere tabulation of which more errors may be introduced than exist in the accounts themselves.

Invention and enterprise fortunately have developed machinery by which all the brain fag and eye-strain of tabulating is practically eliminated, so that errors from that source are infinitesimal, and a pull of a lever or turn of a handle, or mere inspection gives the total. All this is done so much more rapidly than the fastest bookkeeper could write down and then tot up, that to ignore these facilities in devising a system of accounts would be just as reasonable as discussing correspondence methods and ignoring the perfection of typewriters.

Tabulating
and
Calculating
Machines,
p. 60.
p. 349.
p. 366
p. 381
p. 382.
p. 383.
p. 464.
p. 475.
p. 518.
p. 552.
p. 577.
p. 578

The deep-rooted objection to calculating and tabulating machines amongst the rank and file of office staffs is, or has been, due to the fear of unemployment for some of them as the result of their introduction. If, however, the view-point were taken by employers and employed that such machinery, as is under consideration, should not be used to reduce staff so much as to increase the general efficiency of the business, as the outcome of the management having prompter and more instructive figures, then the necessary spirit of co-operation may be evolved that will allow the unfettered

**Tabulating
and
Calculating
Machines.**

development of administrative efficiency. The success of the business is the primary essential to the welfare of the staff.

There may be a distinct gain in some businesses if the calculating work is concentrated in one office similarly to correspondence, without precluding the use of separate machines in technical departments, such as the drawing office.

VI B

COST ALLOCATION

Cost allocation may be defined as the science of arriving at production costs by the process of allocating works expenditure, *i.e.* the entire expenditure pertaining to production. It is a more exact term than costing because some understand costing as merely an occasional investigation and the application of apparent costs which are not susceptible of proof. The essential meaning of allocation is that of allotting to each his share, and therefore of allotting the whole of the shares.

From this it follows that the totals of works expenditure to be dealt with through the cost allocation accounts shall be clearly established by the financial accounting system.

Works expenditure is of three kinds :

MATERIALS, or Goods.

DISBURSEMENTS, *i.e.* Payments, other than wages, for services rendered and contingent liabilities.

WAGES.

Distinction between materials and disbursements is not commonly made, although obvious enough and of appreciable advantage for cost allocation purposes.

Materials fall in turn into two divisions, special purchases and stock purchases. Special purchases are for specific purposes and can be allocated or charged direct to the account concerned, subject to certain store-keeping safeguards as to authority for issue. Stock purchases are first charged to stock and then allocated as issued.

Materials after purchase may be subject to intermediate processes before being applied to final production, *e.g.* gun-metal may be converted into castings and then at a separate stage the "rough" casting machined, to be afterwards finally assembled. The process production costs are allocated to a process account, which is really a variety of production order. The cost value of the respective

Outline of
Principles.

p. 515.

Outline of Principles.

process products is credited to its process account, and the product and, where it arises, the by-product, is charged on to stock for issue in detail and consequently fresh allocation as "material" to either a further process account or a production order.

Finished product that may be made for stock is treated on very similar lines, and is no more than a process product of more final form. The cost account in that case may be termed the stock production or manufacturing account. When the finished stock product is passed into stock, its further and final allocation as "material" will be usually to a sales despatch order.

Arising out of this virtual re-allocation it is convenient to describe the ordinary allocation as *initial allocation* and re-allocation in the form of manufactured material as *final allocation*.

p. 66.
p. 465.

In carrying out allocation, distinction should be drawn and maintained as to direct wages and secondary wages. Direct wages mean the wages directly entering into production and capable of precise allocation, while secondary wages are wages closely associated with direct wages but not readily allocated to specific orders or accounts, e.g. supervision, viewing of work, personal assistance. Direct and secondary wages together constitute what is understood by prime cost wages, or alternatively, manufacturing or production wages. These are sometimes called productive wages, but that is a misleading term to the uninformed.

p. 469.

A further distinction that is desirable where overtime is worked is to keep the overtime allowances on direct wages separate from the direct wages proper.

Direct wages of production orders, provides a better basis for applying production oncosts than the common method of taking direct and secondary wages together, but a still better basis is that of direct time worked.

The degree to which cost allocation requires to be sub-divided under individual orders varies with manufacturing conditions. In the engineering trades the following will usually be desirable and will serve to illustrate the principles involved in dealing with production orders.

Net Production Costs (p. 465).

Production Preparation Costs (p. 467).

Costs of Errors and Defects (p. 469).

Costs of Final Inspection, Packing and Despatch (p. 470).

F 100. Net production costs may be, in turn, sectionalised under the
F 101. respective shop or sub-orders according to the assembly units
F 102. forming the complete product, or beyond that to the individual
components. In certain manufactures sectionalising may be by

symbols marked on the working drawings, in lieu of a standardised assembly unit. Outline of Principles.

Costs of drawings, patterns, jigs and special tools may be of such an extent and the items of such permanent value, as to justify capitalising the cost in part or whole, that is, carrying forward a value at the end of the year as an asset. The principle of keeping these costs separate for each class of product, whether as a section of the first production order, or under a separate order, is most important for financial safety to avoid dubious bolstering of assets.

p. 467.

In the matter of works additions and works expense accounts, sub-division is essential in accordance with agreed standing or syllabus orders. This is an expedient for regularising the form of accounts, and there are serious objections to the common practice of issuing these standing orders to the shops for booking of time and material. The first objection is the resulting inaccuracies of allocation. Another objection is the absence of control by the management, and a third, the resulting absence of detail information whereby efficiency can be stimulated.

p. 477.

To meet these objections, plant orders are advised in conjunction with suitable arrangements for collating the costs under the appropriate standing order. The system can be accommodated to minor repairs and plant attendance by periodic (say fortnightly) orders, distinctly specifying the work to be covered.

F 96. p. 412.

The plant order system has obviously even stronger claims to consideration in connection with works additions to guide the valuation of capital assets.

p. 410.

The same principle has no less valuable application to regular production in the form of sub-orders for batches of components. Numbered job tickets for the separate operations on these batches, as frequently used, are but a refinement of sub-orders, and it is quite possible to incorporate these minute allocations as recognisable items in the main cost accounts, though such a course, apart from expense, tends to delay the presentation of the cost returns.

p. 146.

F 155.

Cost allocation has reference to the entire works expenditure, and obviously, therefore, some agreement must be established between the total cost as allocated and the total works expenditure. It is the function of the cost accounts to furnish the totals of cost allocation and for the financial accounts to furnish the totals of works expenditure. The interlocking of these two sets of figures is essential to ensure reliability in the cost accounts, and if this interlocking or agreement is imperfect the costs furnished by the cost accounting systems can never be susceptible to audit.

p. 442.

p. 567.

Outline of Principles.

p. 492.

If the cost accounting system is to be self-contained, there must be a clear understanding as to what is works expenditure. The settlement of principle must be carried out in practice; every invoice, every petty cash disbursement, every wages or salary payment, must be definitely classified in the financial accounts as either works expenditure or general (commercial) expenditure.

Every item of works expenditure recorded as such must be accounted for through the cost accounts, and to provide the means for proving that this is the case, a *works accounts register*, called in the earlier editions a works expenditure book, is necessary. The change of title is to avoid possible confusion as to a works expenditure book being a cost ledger.

The works accounts register is a record of all items of works expenditure as incurred. The works accounts office is officially notified as to what the items are by a weekly cash report of petty disbursements and wages. The fact, that the total of wages to be paid is probably arrived at by the works accounts office, does not affect the principle that the financial department should advise in writing the payments made for works purposes,

The reverse process is convenient with purchase invoices, viz. for the invoices to be first accepted by the works before being entered in the financial books. This obviates a report as to purchases made and the financial books are kept in agreement with the works books by the recognition, as works expenditure items, of only those invoices that have been serially numbered in the works accounts office, where they are entered in the works accounts register.

Specimen rulings of the works accounts register necessary to conform to the requirements of the cost accounting principles, as set forth above, are given in Section VII c. The guiding principle is that works expenditure shall be dissected under such heads as shall facilitate the stages of cost allocation and stock accounting on the one hand, and facilitate the book-keeping agreement of totals on the other, by reducing the field of possible errors.

The dissection to be provided for is as follows :

- | | | | |
|------------------|---|----------|--|
| Purchases | - | (p. 453) | Materials allocated or charged direct. |
| | | | General stock. |
| | | | Component stock. |
| Purchase Credits | | (p. 460) | Same dissection as purchases. |
| Disbursements | - | (p. 458) | All entered under one heading. |
| Wages | | (p. 462) | Time or ordinary wages. |
| | | | Extra pay and special allowances. |

- Works Product - (p. 449) Process product charged direct.
 (p. 515) General stock.

**Outline of
Principles.**

Component stock (rough or finished). F 118, 119.

These matters are the subject of further notes in the tabulation of cost allocation routine on page 473, *et seq.*

The old and still common way of dealing with material allocation takes the form of analysing the bought book or purchase journal, in which all invoices are entered. The number of analysis headings adopted usually are not very numerous and depends on the size of the sheet used—subsidiary analysis is, of course, possible as a footnote to the respective columns. **Material Allocation.**

The analysis of purchases arrived at in this way forms the subject of entries in impersonal accounts in the financial books and so furnishes a certain amount of detail for the profit and loss account. No attempt, beyond that evident in the analysis headings, is usually made to differentiate between works and commercial expenditure. The method as a system of costing is essentially crude, but is almost the universal practice where works' accounts are not kept separate. The outstanding ground for advocating such a division is to obtain more accuracy in the application of production oncosts apart from questions of prime cost.

It is, moreover, the general practice to merge disbursements with purchases of goods under the term materials, but it is recommended that in the cost allocation system, disbursements shall be treated as distinct from materials or goods. F 129.

Purchases fall into two classes, "special" and "stock," or, if all goods are the subject of stock control, "special stock" and "ordinary stock."

Under most circumstances, special purchases being made for a specific purpose or order, as set out on the originating purchase requisition, it is a reasonable assumption that the goods will be utilised as intended and, therefore, their cost may be directly allocated to the order in question. This being the case, direct allocation from the purchase journal by analysis under column headings would seem simpler without loss of accuracy. That much can be admitted, but details under each account heading can only be surveyed by referring to the separate invoices and this is a very serious handicap when there is any intelligent criticism to be made of expenditure.

Purchase journal analysis can rarely attempt dissection under individual production orders, whatever it may achieve for capital additions and works expenses, so that it is no short cut to a costing system.

**Material
Allocation.**

The advantages for cost allocation and stock accounting all lie with entire independence of the purchase journal, except as to agreeing the grand totals of works expenditure to be accounted for.

p. 295.

F 82 This independence is achieved as to purchases by a system of goods received notes for all receipts. These goods received notes pass to the works accounts office, where they are used firstly for passing the invoice, and secondly for allocation or stock accounting purposes after the invoice amounts have been entered thereon.

p. 310.

In the case of stock materials their issue will be subject, under all but the crudest methods, to control by some form of authorisation.

F 86.

F 125 From these issue vouchers or from summaries of same, allocation will be made, after rating and extension, and the respective stock account credited.

p. 312.

F 87 For materials returned from the shop into stores, whether good or scrap, a shop credit slip is convenient, from which suitable adjustment of accounts can be made.

In the case of scrap, including swarf or cuttings, which is in the nature of a by-product, the credit should pass, so far as possible, to the account to which the original material was debited, and the untraceable items ultimately credited to the works profit and loss account.

F 154.

Although special purchases can be directly allocated on the basis of the intended purpose, it is sounder that their use should be confirmed by a goods issue voucher, or equivalent, if only to establish the responsibility of the storekeeper for the disposal of the material. In certain cases, it may even be desirable to keep the special purchases in suspense and only charge out as issue vouchers come to hand.

p. 154.

p. 311.

p. 312.

The control of the quantity of material that should be issued to the works, beyond the control exercised by the stores requiring the authority of a goods issue voucher, usually signed by a foreman, may be vital to true costing and works efficiency, but is a matter of production regulation.

Distinction between direct and secondary materials is considered on page 465.

**Purchase
Invoices.**

There is a matter of seven stages in the passing of an invoice, and it will be convenient if a rubber stamp endorsement is applied to each invoice, with provision for these stages to be certified, as follows:

Invoice No.	Agreed with Purchase Order.	Prices checked.	Calculations checked.	Goods received in good order.	Noted for Works Accounts.	Passed for Ledger.

Some consideration is necessary of these stages.

Purchase
Invoices.

Invoice Number.

The numbering of invoices is best done when the invoices are completely passed and ready for entry in the works accounts register.

F 115.

The numbers will be allotted by the works accounts office, and there should be no difficulty in entering the invoice totals in the financial books in numerical sequence. This will ensure that the financial department will receive all invoices accepted by the works accounts office.

The numbers used can very well start at 1 each year, and run on during the course of the whole year.

The invoice numbers will be entered on the respective goods received notes concerned.

F 82.

Agreed with Purchase Order.

F 15.

This stage is of distinct importance as ensuring the effective regularising of purchases.

In the case of goods ordered by telephone, this procedure will ensure that an official confirmation order is issued in every case. Some responsibility attaches to the supplier in this connection, but it is not safe to rely on him pressing the point of obtaining a written confirmation of a verbal order, whether given by telephone or personally. In the latter case, particularly when responsible officials give a verbal order for goods, it is hardly reasonable to put the onus on the supplier of obtaining confirmation. If the routine is such that an official order has to be made out, although not necessarily posted to the supplier, before the invoice can be passed, it will greatly help the management to control matters.

Prices Checked.

To efficiently check prices means continuous care in the issue of the purchase orders. Each order should state the terms of purchase as clearly as possible.

p. 280.

As a matter of abstract principle prices should be checked by a department that is not responsible for purchasing.

To apply this theory is not always convenient, and difficulty is sometimes made over the consequent need of informing the works accounts office, which presumably should do the checking, of the terms of purchase when there may be reasons for not stating them on the order.

**Purchase
Invoices.**

Whatever authority may be vested in the buyer it is wholly desirable that the prices at which he purchases should be subject to a certain amount of independent criticism. The criticism can only be effective when associated with the power of holding up the invoice from payment. The works manager will be the officer to whom the works accounts office will submit their price queries.

Extensions and Totals Checked.

No comment is necessary in this connection unless to remark that this checking should not be done perfunctorily.

The net invoice amounts will require to be entered on the respective goods received notes, thus allowing the invoice to go forward to the financial department, and for the works accounting to be carried out from the goods received notes. The totals of each invoice are, of course, duly entered in the works accounts register and analysed under the following heads :

Purchases allocated direct.	General Stock.
Component Stock.	Returnable Packages.

Goods Received in Good Order.

For the works accounts office to certify as to this stage, it is necessary that they have a goods received note, duly signed as to quantity and quality of the goods in question. It is quite important that such a report should be furnished for every receipt of goods, and to ensure the maintenance of the routine, the respective goods received note number ought to be quoted by the works accounts office on each invoice.

Noted for Works Accounts.

This might almost as well be expressed as "Entered in Works Accounts Register," for that is what it amounts to. Once the entry has been made in that book, there can be no question of ultimate allocation in the cost accounts.

F 129. The actual cost account references are entered in the works accounts register and this meets the requirements of auditors, assuming that proper agreement is effected between the cost accounts as a whole and the respective suspense accounts in the financial books, see page 567.

Passed for Ledger.

This final stage in the passing of an invoice is carried out by the financial department. It is in effect a passing for

payment, but is better expressed in the way indicated to ^{Purchase} avoid confusion with the passing, by the directors, of ^{Invoices.} accounts for payment.

In the case of goods supplied on approval, an official purchase order should be passed, but the invoice should not be entered in the works accounts register until the goods are finally accepted.

It may be remarked here that invoices held over for the above or any other reason, and goods received notes awaiting invoices, can be advantageously held in what is sometimes called a ready sorter, consisting of a number of stout cardboard leaves in book form, lettered alphabetically. This device is a considerable time-saver in connection with the passing of invoices. From its contents, at any time, it will be easy to ascertain details of invoices received but not passed, and of goods received but not invoiced—a vital point at the end of the year or for any intermediate profit and loss account.

It will save much time and benefit the accounts generally if the works accounts office prepare early each month a statement showing the invoices held up and the reason for same, and a further statement detailing the goods received for which invoices are not to hand. The latter statement may be advisedly anticipated by the works accounts office sending out postcards for invoices not to hand, as this becomes apparent by looking through the waiting goods received notes—say weekly.

In the case of goods received on loan, a carbon copy of the acknowledgment of goods received will be a more distinctive medium ^{F 83.} than a goods received note, though otherwise treated the same.

The question of cash discounts is discussed on page 530.

It is almost unnecessary to mention that the works accounts office must be instructed as to invoices that have to be passed to the financial department within a specially short period to obtain an extra cash discount, or to prevent interest being charged if not paid by a specified date.

When an invoice has to be passed for this reason without a complete goods received note being obtainable from the works—complete, that is, as to inspection, for in all else the report should be in proper order—the invoice should be endorsed plainly by rubber stamp “Passed without inspection,” and a note made accordingly against the particular entry in the works accounts register. The works accounts office will be responsible for seeing that this provisional acceptance is duly confirmed by a viewing report from the works. ^{F 98.}

Where the rule is general to pay accounts within a few days of date of invoice to obtain an extra cash discount, the general stores should not detain goods received notes, pending detail inspection

**Purchase
Invoices.**

of the goods, if this cannot be effected within, say, twenty-four hours. In that case, the goods received note should be sent, not later than the day following receipt of goods, to the works accounts office boldly endorsed "Viewing Report to follow." The works accounts office can use their discretion as to passing on the respective invoices at once to the financial department, duly marked as already suggested.

When goods are bought for cash, instead of through a ledger account, no difference should result in the works accounting routine beyond the fact that the entry in the works accounts register would
F 120. be derived from a cash report to works, as furnished fortnightly by the financial department, instead of from an invoice.

A point might be made as to the disadvantage of cash purchases, so far as the general stores routine is concerned, in that no purchase order is created and the routine as to the goods received note is incomplete and sometimes confusing, having to be made good by the cash report to works. This, of course, is particularly likely to be the case if purchases from any supplier are sometimes for cash and sometimes for ledger account. This state of affairs is apt to occur with purchases from local tradesmen and is to be avoided. There will probably be an economy effected in the long run if local purchases have to go through the full routine of a ledger account.

**Disburse-
ments.**

It is advocated that disbursements shall include such items as rent, rates, taxes, insurance premiums, staff salaries, wages of workmen employed away from the works, and outward transit charges, in addition to the usual petty disbursements.

In the case of staff salaries (both monthly and weekly), their inclusion in disbursements allows better for the requisite privacy as to the rates of pay, and, in a lesser degree, as to the allocation of the pay.

There is the further point that weekly salaries usually are paid up to the end of the week, while wages are only paid up to the preceding Wednesday or Thursday.

With regard to the wages of workmen employed away from the works, the making up of the works wages book is facilitated by
F 37. excluding away-time, except, perhaps, for gangs of men sent away to continue work started virtually in the works, as for a war-ship's trial.

In the matter of outward transit charges, their inclusion under disbursements is quite in line with the principle advanced. On the other hand, the inferred exclusion of inward transit charges apparently contradicts that principle, except that carriage paid on goods received may be very well held to be part of the purchase price. It

would certainly be inconvenient to separate such charges from the material account, and, if possible, they should be allocated with the purchase cost of the goods. **Disbursements.**

There are certain conditional liabilities which may conveniently be considered under the designation of disbursements, although it will not be necessary to make any corresponding entries either in the works accounts register or the cost allocation accounts except that they have to be provided for as production oncosts. These conditional liabilities are as under, and are incorporated in the cost accounts through the production oncosts book, and in the financial accounts through the medium of the works accounts annual abstract.

F 163.
F 134.
p. 444.
p. 655.
p. 671.

Depreciation and obsolescence of Buildings and Plant.

Depreciation and obsolescence of Stock.

Development and Experimental Expenditure not carried forward at end of year.

Estimated Guarantee Liabilities on year's products.

Interest on Capital employed in production.

Disbursements differ from purchases in that they cannot very well be passed from an equivalent of the goods received note except it be created in the works accounts office.

It will, therefore, be necessary to have a disbursements book F 121. in which the various charges can be entered in detail, and approving signatures obtained therein from responsible officials before any debit is accepted as regards the cost accounts. This book will be of considerable value for reference purposes from year to year, if appropriately indexed, and should ensure no account being passed twice. Each invoice treated through this channel must be clearly marked as "Disbursements."

Petty disbursements and cash disbursements such as salaries appearing on the cash reports to works, do not require to come within the scope of the above book. F 120.

Outward transit charges, although probably in the category of disbursements for the most part, will not require to be entered in any detail in the disbursement book.

In the matter of returnable packages, to put the accounting on a proper footing, it is very desirable to institute a returnable package card. A card will be made out in the works accounts office for each package charged for, and these cards will be passed to the general stores that they may be in a position to know what packages will be credited if returned, and also whether the charge made for the package is such as to justify fully the carriage necessary to return it. **Returnable Packages.**

F 84.
p. 295.
p. 494.

**Returnable
Packages.**

- With this information in their hands they are enabled to make out a returns note, suitably endorsed by rubber stamp or printing, that will serve to notify the supplier of the amount of credit due on the returned case. It is assumed that the works accounts office will receive a copy of all returns notes so that they can make the necessary entries in the works accounts register (credit section), and pass the returns notes on to the financial department for posting to the respective suppliers' accounts.

The following is a suitable endorsement for these returns notes :

" Please credit our account with the empty packages returned as per particulars above. An acknowledgment will not be necessary if you agree with our figures. Please note that we hold the signature of Garman should it be necessary to take up the matter with the carriers on account of non-delivery."

- While there should be no omission to return promptly all packages that it is intended to return, it is necessary to keep a suppliers' package record of how matters stand with each supplier individually. Only packages that are returnable will appear on these records.

When a package is charged that is not returnable, the only simple course is to include such charge as part of the cost of the goods contained therein, and to give the despatching expenses the benefit, if the package can be used for sales purposes.

Care should be taken to see that all charges made for unreturnable packages are reasonable.

The suppliers' package record will have entered on it all returns of packages, and will require to be adjusted as to any returnable package which it has been decided not to return. The works accounts office will derive their information, as to decision not to return any package, by receipt of the returnable packages card marked accordingly.

Outstanding items on the suppliers' package records can be made the subject of enquiry by the works accounts office, which may thus check the stores work in this connection.

If packages are looked after in this way, there need be no occasion to differentiate packages in the bought ledger, and the accounts each month can be settled in full without deducting packages. The margin of packages that may get paid for one month only, to be credited later, should be too small to disqualify the arrangements proposed.

The financial department can make reference to the suppliers' package records, if need be, before paying any account.

**Purchase
Credits.**

p. 297.

In discussing the passing of invoices no reference has been made to the procedure occasioned by inability to accept a supplier's invoice through some query.

Questions relating to prices charged are usually of a nature requiring a letter, but, generally speaking, invoice differences can

be cleared up most effectually and rapidly by sending a specific claim to the supplier for the difference in question. Particular attention must be paid to giving all the requisite information, and, in the case of goods returned, to quote the returns note reference. Purchase Credits.

The usual practice is to render this claim in the form of a debit note. This accomplishes all that is necessary from the purchaser's point of view, but the method is blunt and does not sufficiently indicate by its style the necessity for a credit note to be sent by the supplier. The purchaser is not so much concerned to receive a credit note as to know that the credit has been duly allowed in the supplier's own books of account.

There are certain claims for credit that call for mutual agreement and yet to depend on reaching an agreement by correspondence means waste of time and holding back invoices from entry in the account books.

The manner recommended, therefore, for making these claims is to issue a credit claim note to serve as a debit note. The title F 165. allows a wider application of the form and can include tentative claims; it also allows a less blunt though not less effective wording of the claim. The credit claim note can be phrased as follows:

"We have to notify you that we have provisionally debited your account with the amount given below for the reasons stated, and shall be glad to have your Credit Note confirmation per return."

It will usually be found best to have credit claim notes made out in triplicate by the works accounts office. The top copy will go to the supplier and the second to the financial department.

The works accounts office will enter each claim in the works F 117. account register (credit section). Credit notes received from the suppliers in response to credit claim notes will remain with the financial department, and only be referred to the works accounts office when there is disagreement with the credit claimed or no corresponding credit claim note. This arrangement is good in stimulating the works accounts office to look properly after obtaining all purchase credits to which the firm are entitled.

The financial department may hold their copies of credit claim notes two or three days before posting the amounts to the respective suppliers' accounts. This will give the supplier the opportunity of disputing or confirming the claim before making permanent entry in the financial books.

The invoices in connection with which credit claims are made at the time of passing the invoice, should be plainly endorsed by a rubber stamp, giving the requisite reference and amount of claim.

In regard to claims for shortages in weights, these can be the

Purchase
Credits.

more readily enforced when the weighing machine used for the receipt of goods records each weighing.

A point may be made as to the procedure when goods are received that require correction. Under any ordinary circumstances the goods should be returned to the supplier, carriage forward, for correction. If, however, time or any other reason makes return undesirable, and the purchaser elects to make the necessary correction himself, it is important that he come to terms with the supplier beforehand as to the credit to be allowed.

Coming to the question of rejected goods, it will be found a much safer practice to claim credit for each return, and to issue a regular purchase order for the replacement, if replacement is required. This procedure will bring the replacement into the regular routine for following up delivery.

Under this arrangement all replacements will be charged for, and there is, therefore, a need to embody in the replacement orders the returns note reference of the goods returned, to ensure that no invoice is accepted for replacements unless credit has been claimed for the rejected supplies.

When dealing with a supplier who prefers to replace free of charge and not to credit the rejection, it may be necessary to create a dummy invoice, and make an entry to cancel the credit claim note. This occasional trouble will not discount seriously the gain to the works accounts and the financial accounts in having no credits held up, or the advantage to the general stores as to having replacement orders handled through the regular channel.

In the event of a supplier making an error in an invoice against himself, it is only right that he should be notified by letter. The letter should be no more than a notification that a certain item is not agreed as to quantity or calculation—leaving the supplier to investigate matters for himself. It is doubtful if any notification should be sent of undercharges in regard to prices, unless an obvious mistake, in case the lower price should be intentional.

Wages
Allocation.
p. 346.
p. 356.

Wages costs arise from expenditure of time, for which wages are paid. The allocation of the time, or timebooking, as it may be called, is therefore the basis of the wages cost allocation. It has been found more convenient to consider this question at length under Administrative Records (Section V D).

Differentiation between direct and secondary wages is discussed on pages 450 and 465.

One other point remains as to wages costs, namely, the allocation treatment of what may conveniently be called extra pay, which

may be defined as piecework balances or premiums or bonuses, according to the system of payment by results in use. **Wages Allocation.**

Viewing or inspection of the work is necessary to efficiency under a system of time work and is still more necessary to avoid careless work when any direct incentive to output is given by a system of extra pay.

The point to be brought out is that viewing certificates, in whatever form expressed, cannot readily be given before the wages book is made up for work done in the latter portion of the pay week. **F 97. F 31.**

Further, the work of computing the extra pay cannot be handled simultaneously with the calculation of the time wages without excessive staff, whereas by deferring payment until the week following the completion of the respective jobs, the office work in this connection can be accomplished before the ordinary wages work. **p. 252. p. 361.**

This arrangement will allow the viewing to be carried out more effectively by not entailing a rush on a particular day. It will be a matter of administration to ensure that no dilatoriness, in getting viewing completed, results from this practice.

Following from these considerations, it will be distinctly advantageous for the extra pay items to be furnished quite independently from the time allocation sheets, so that the latter may be free for cost allocation purposes. A further substantial advantage is the increased facility for agreeing the cost allocation totals with the wages paid, and for this purpose the wages paid are dissected in the accounts under the two headings of ordinary wages and extra pay. **F 29. F 28. F 131. F 116.**

Cost allocation depends for its accuracy on the initial information supplied by time allocation sheets and goods issue vouchers very much as the accuracy of sales invoices depends on the accuracy of the despatch notes detailing the goods delivered. **Cost Allocation Require- ments.**

The correctness of this basis information is not a matter of book-keeping, and may be said to be more one of administration.

The attainment of bookkeeping accuracy of cost allocation is only useful if the basis information is right. The means by which this rightness shall be achieved is more appropriately discussed in Section V. Administrative Records.

For the most part, therefore, the discussion in this section must presume that correct information is supplied to the works accounts office, so that the accuracy that has now to be catered for is one mainly of bookkeeping.

In giving prominence to this aspect of cost allocation accounts, the object is to emphasise that bookkeeping accuracy is a vital necessity that many costing systems, particularly of the card index variety, seem to leave to chance.

**Cost
Allocation
Require-
ments.**

This remark is not intended as any reflection on card index systems for costing purposes, as the flexibility of this mechanism, for mechanism alone it is and not self-operative at that, makes its adoption a highly commendable course.

This question of mechanism, be it cards, removable sheets in binders, or bound books, has a considerable influence on the practicability of any cost accounting system. On the other hand it is hardly the right sequence to select the mechanism before settling on the general principles of a scheme of accounting appropriate to a given works.

p. 577. Speaking generally, cost figures that are wanted regularly should be accessible from the records without any analysis.

This means that if the costs of individual components are in constant request the cost records must be in unit form, to be aggregated when necessary for obtaining the cost of the complete product. Under such circumstances the card index is about the only feasible means, there being practically no limit to the number of accounts that can be handled in this way.

p. 447. The larger the number of separate records to be dealt with the more important becomes the use of calculating machines for aggregating totals. Further if the records are in the form of punched
F 166. cards for use in a tabulating machine, there is no hindrance to the fullest possible adoption of unit records.

The more usual conditions are that cost totals are required for complete products or orders more frequently than for individual components. From the bookkeeping point of view the more reasonable number of accounts, resulting from the costing of complete
F 129, 130, 131. orders, will considerably facilitate agreement of totals and consequent accuracy.
F 132.

Given a reasonable number of accounts, the advantage as to mechanism will lie with the adoption of removable sheets in suitable binders.

When the practice is for the cost allocation accounts to aggregate the costs of each production order, some sections become imperative if proper use is to be made of the cost accounting system generally.

p. 450. The following sections already mentioned will meet the main requirements :

Net Production Costs.
Production Preparation Costs.
Costs of Errors and Defects.
Costs of Final Inspection, Packing and Despatch.

Whatever sections of costs, short of unit component costs, are considered suitable for a particular kind of business, there will still remain a need to embody in the cost allocation accounts sufficient detail to make further analysis possible when required.

The requirements for controlling the costs of individual components by comparison of cost data need not necessarily be met entirely by the cost allocation accounts. Much useful information in this direction can be obtained from the job tickets for the several operations on each batch or for a given period. This work falls rather better within the scope of production estimating.

The basis information will be the same as far as the cost accounts proper, but there will be more freedom in treating the figures, with however some risk of inaccuracy, which comparisons should, as a matter of fact, detect if serious.

In the ordinary way the net production costs are often considered as synonymous practically with what are termed prime costs.

Prime cost is generally held to be the direct material, disbursements and wages costs exclusive of production oncosts, but the term is sometimes used as inclusive of oncosts. However, to avoid possible confusion, these inclusive costs are here designated "net production costs."

Obviously some definition is necessary as to the meaning of "direct" costs, and a near approach to a definition will be to state that "direct" materials are those materials actually embodied in the product, and "direct" wages are the wages paid for labour expended in the forming or actual shaping of the product. This is a very narrow definition which, in regard to wages more particularly, cannot be accepted quite literally.

Costs that are not strictly direct and yet enter into net production costs may be conveniently designated secondary materials and wages respectively.

In the case of materials, secondary costs will not figure largely under the majority of works conditions, though the possibility requires consideration. An instance of "secondary" material would be the supplies of fuel and lubricants necessary for the inspection trials of an engine. These supplies obviously do not become embodied in the product. This instance assumes that such supplies are charged to the specific order under which the engine is made or sold, instead of being treated as departmental sundries to be distributed over the work done in the department.

As to "secondary" wages, this is likely to deserve recognition in every works.

Secondary wages are virtually indirect wages that are charged to orders or product instead of to a works expense account. Thus the wages cost of viewing are "secondary" wages when allocated to a specific production order. Whether it should be so allocated is a matter for local decision according to the nature of the business,

Cost
Allocation
Require-
ments.
F 63.
F 61.

Net
Production
Costs.

p. 450.

p. 287.
p. 489.

p. 489.
p. 490.

Net
Production
Costs.

*For mass production, viewing can hardly be treated in any other way than as an expense, whereas on special contracts it will probably be held advisable to include viewing or inspection costs under the respective contracts.

The two other common instances of indirect wages that may be treated partly or wholly as secondary labour are supervision and personal assistance.

Where it is felt that these costs should be included under specific production orders, the difficulty of allocation may be got over by distributing the respective costs for a given period on the same basis as the direct hours worked. This will, at least, be more nearly equitable than allocating on some inadequate report furnished by the foremen or men concerned, and will ensure the unfamiliar orders getting their fair burden equally with the more easily remembered orders.

To obtain the proper advantage in the cost records from the differentiation of direct wages from secondary wages, suitable provision must be made in the form of the cost allocation account.

F 13† The cost allocation sheet needs to be designed to furnish this distinction, and provision can also be made for keeping direct machine wages distinct from the direct hand wages. This distinction or dissection entails very little more clerical work, if any, and adds considerably to the usefulness of the total cost figures of any order—
F 10 particularly for comparison with estimated costs, providing these are also built up under the two heads of machine and hand wages.

The extent to which secondary materials and wages are allocated to production orders will have some bearing on the production oncost rates to be adopted. The simplest course is to compute the production oncost rates as if all secondary labour were included in works expenses, and then, if need be, to make a rebate on the total production oncosts applied to any order, if the amount of secondary material and secondary labour allocated to the particular order is excessive. It may be remarked that production oncosts should not be applied to secondary labour.

p. 489.

In some businesses the treatment of overtime allowances on direct labour will require consideration. It may easily prove very valuable information to have the totals of these allowances on each order, as throwing light on the circumstances under which the order has been carried through. When that consideration does not hold good there will still remain a sufficient reason for distinguishing these expenses, namely, so as to keep the direct machine and direct hand wages figures on a basis properly comparable at any date with those of other similar orders.

In the case of secondary labour there will be less occasion to separate the overtime allowances.

Coming to production oncosts, this is a question of wide scope, and is discussed elsewhere. For the present purpose it will be sufficient to indicate that the adequate treatment of production oncosts involves their application to the detail wages charges on the time allocation sheets before the items are posted to the cost allocation sheets.

**Net
Production
Costs.**
p. 528.

When this routine is followed, there is no difficulty in discriminating to any extent desired between the different classes of work done and the different machines used as to the appropriate production oncosts rates to be used.

p. 544.

A point may be made as to the likelihood of sections of the net production costs being necessary. These may follow the lines of the sub-orders suggested in connection with production regulation

p. 116.

Cost sections under names of the various groups of parts are not likely to be quite satisfactory. The use of symbols, which should be the reference number of an assembly unit, as described on page 96, *et seq.*, will be much the better plan. Any symbols adopted for this purpose should be marked on all the works drawings involved, for only by such means can any consistent interpretation of the scope of each sub-division be expected.

This question of sectionalising by groups of parts should be settled jointly by the drawing, production estimating and works accounts offices.

Where cost sections corresponding with sub-orders are adopted, it will be more satisfactory to apply the sub-division to the labour costs only, and to merge the material costs in one account under the main order reference, relying on analysis afterwards if necessary.

p. 577.

The section of an order cost covering the cost of drawings, patterns, jigs, special tools and gauges represents what may be described as the cost of production preparations that would not have to be incurred on repeat orders. The probability of repeat orders being obtained would, therefore, be the deciding factor in settling whether to leave the whole cost against the original order or to transfer some part of the costs afterwards to works capital additions. A conservative policy is important, as special tools quickly become obsolete on the least variation of design, and repeat orders are apt to be a little different from the original, even supposing that they come along at all.

**Production
Preparation
Costs.**
p. 35.
p. 139.
p. 400.
p. 522.

**Production
Preparation
Costs.**

In the case of special products, few will question the advisability of charging preparation costs to the original order, but in the case of stock products the ruling will not be as generally approved.

The argument for charging the cost of the production preparations to the initial stock production order for each line of product is to localise the expenditure.

It will be well that these preparation costs should be reviewed in the light of the selling policy to be adopted, or what may be the better sequence, for the selling policy to be the influencing factor in the amount of preparation expenditure that can be allowed, particularly on jigs and special tools. It is, however, a difficult matter to limit expenditure on jigs, special tools and gauges beforehand, although there may not be much difficulty in deciding for each opponent, as it comes under review, what special equipment will prove economical for the quantity contemplated to be made.

The control of expenditure on jigs, special tools and gauges is one requiring the exercise of much judgment by the management, and the commercial aspect should be given proper consideration. It is easy to waste money in production preparations for lines that cannot be sold or for which inadequate efforts to sell are made, just as it is possible for a short-sighted policy to blight the selling prospects by not allowing sufficient economy to be exercised in the repetition cost of production, such as an adequate supply of special tools might achieve.

It is a desirable practice for the cost of drawings to be charged to the orders for the product concerned before being transferred to works capital additions, if at all.

Draftsmen are not unsusceptible to administrative influences, and there will be an actual economy in adopting the practice of charging their time to the specific production orders worked on.

Certainly it is not very satisfactory to value drawings in the first instance, except on some basis of cost, and if no inventory value whatever is to be given to drawings the works expenses may be unreasonably inflated.

Works assets of the nature of drawings, patterns, jigs, special tools and gauges will be subject to an annual writing down in value, apart from ordinary depreciation, if the sum total of their values in the books exceeds the limit considered by expert valuers as properly proportionate to the turnover of the business. Where conditions allow it, this writing down can be anticipated in part by not transferring the full cost to works capital additions.

For certain classes of manufacture, when large quantities of special articles are produced, the special tools will require renewing

and maintaining during the course of the contract, and the same may hold good of the patterns. Production
Preparation
Costs.

From the point of view of possible inventory values it is important that these costs of maintenance shall not be included with the original costs of the patterns, jigs, special tools and gauges dealt with above.

Further, it may be misleading and quite undesirable to debit these expenses to the ordinary works expenses as repairs to loose plant, therefore, when the nature of a production order requires it a special cost section may be opened.

It is possible in consequence of such expenses being specially allocated to a production order in this way, that there ought to be a rebate in the total of the production oncosts in such cases. F 133.

In fixing the rate at which stock product shall be charged into stock, some margin should be added for drawings, patterns, jigs, special tools and gauges. F 128.

Every order is liable to incur abnormal expenditure in consequence of errors and defects. The errors may be of drawing, of workmanship, of instructions or misunderstanding, and defects may refer to design or to materials. Generally speaking, the varieties of mishaps possible in this connection are numerous, and it is very desirable to separate the cost of same on each order from the net production costs. Errors and
Defects.

When errors and defects arise in the initial stages of a new line of product it may be admissible to transfer some portion of the costs to developments and experiments, to be dealt with through the financial accounts at the end of the year as a charge against the works profit and loss account. F 164.

In contending for a separation of the costs of errors and defects from the net production costs, it should be pointed out that this can only be achieved, satisfactorily and economically, by estimating in each case from detail viewing or inspection reports. The costs as they are incurred will be allocated in the first instance as production costs and adjusting transfers made on the basis of the estimates just referred to. p. 187.
p. 580.

There may be cases when the cost of errors and defects can be obtained through the ordinary allocation routine by the issue of a special sub-order, but to endeavour to divert the costs to the cost section for errors and defects during the progress of the work is not likely to be successful in the numerous minor instances.

For factories engaged in the mass production of one article it will probably be better to treat the costs of errors and defects as

Errors and Defects.

a works expense, but where the products are varied this course is not recommended, as being likely to result in somewhat misleading figures for the respective production order costs.

It will be convenient to consider as errors or defects all wasted material and labour consequent on any alteration of design after the shop print has been issued. The cost of unsuccessful special tools or unsuccessful processes may be transferred to the cost section under consideration, or, it may be, to the developments and experiments account.

Final Inspection, Packing and Despatch.

The necessity for keeping a cost section for sales (despatch) orders under the heading of final inspection, packing and despatch will be readily appreciated, though the importance of this point will depend on the nature of the business.

Tests that are made in the ordinary course of production constitute a part of the net production cost. Final inspection may involve trials of an expensive character before the customer will accept delivery. Probably there will be a separate testing department in which such trials will be carried out. It will tend to give more useful figures of the production costs if the testing wages are treated as secondary wages, as not directly adding to the intrinsic value of the article tested.

In the matter of packing and despatch costs, these are not precisely works costs, seeing that delivery to warehouse is the real finishing point for the works, but convenience of administration will usually dictate the inclusion of warehouse costs and transport expenses in the works accounts.

Works Expenses.
p. 477.

With regard to works expense accounts, the problems of allocation are discussed at length under the subject of standing orders.

A point may be made as to the possibility of all three classes of labour, as mentioned in connection with net production costs, appearing in these accounts. The direct machine and direct hand labour will occur on repair jobs. It will tend to a more consistent system if wages that are considered secondary wages when allocated to a specific production order, are still posted under the heading of secondary wages, even when allocated to an expense account, although the reasons previously given for doing so may not apply wholly.

The oncosts that may seem at first sight to be incurred in respect to direct machine or hand wages allocated to an expense account, are ultimately charged to product through apportionment of these oncosts to the producing departments.

The costs for each account period will be reported, under each **Works Expenses.** standing order reference concerned, on the works cost allocation abstract.

F 162.

The costs of works additions should be kept generally in the same form and style as those of production orders.

Works Capital Additions.

Consideration is given in the discussion on plant records to the main headings for works additions accounts.

p. 400.

The practice is advocated of issuing plant orders for each works addition, and for separate cost allocation accounts to be kept for each such order. The details of the plant order costs, falling under any one of the headings recognised in the financial accounts, are summarised on plant orders cost summaries.

F 137.

It is the more common rule amongst public auditors to admit works additions at the bare cost of materials and wages only, although production oncosts are as truly an element of works additions costs as of production costs.

p. 407.

For the sake of knowing the true works cost in each case, and for making the basis of the production oncosts rates more regular, the procedure is strongly recommended of applying production oncosts to works capital additions costs in the works accounts. If the resultant total works cost exceeds a fair valuation for the items in question then the excess cost should be written off.

p. 497.

Coming to the question of the costs of developments and experiments, so far as these are derived by transfer from production orders, no further comment is necessary.

Developments and Experiments.

p. 12.

Specific orders should be issued for each substantial experiment, and should be treated on much the same lines as production orders. It may even be worth while having similar cost sections, excepting that for final inspection, packing and despatch. Generally speaking, it is essential to issue separate orders for every experiment, with a view to controlling the expenditure in this direction. A general order for minor experiments is only admissible over a given short period.

p. 572.

p. 580.

F 12.

To avoid the adoption of a standing order for aggregating costs of this character, arrangements are indicated in dealing with production oncost for the developments and experiments account to be kept in the production oncosts book. A parallel account is necessarily kept in the financial books and derived, as to costs, from the periodical works cost allocation abstract.

p. 562.

F 162.

There should be no doubt about including production oncosts in the cost of experiments. It is indeed easy to demonstrate in

**Develop-
ments and
Experiments.**

most cases that the oncosts are higher on this class of work than regular production. The objections raised to this course are untenable, for otherwise a false idea of the costs of experiments would result, and this would react unfavourably on the production costs of the regular product.

p. 469.
p. 523.

The object of including the term developments in the title of the account under consideration is to justify the inclusion of costs that are experimental virtually in regard to methods of production rather than of design pure and simple. The possible transfers to this account from the errors and defects section of production order costs, as previously mentioned, will fall into the category of development expenditure.

**Commercial
Expenditure
by Works.
p. 492.**

In the matter of expenditure by the works for commercial purposes, this is also discussed under standing orders. A further point is necessary here as to production oncosts being applied to work done of this character. From the financial point of view, these are expenses to which it is not permissible to add other expenses, but the amount likely to be at issue will be too small to materially affect the works expenses totals.

Under exceptional circumstances the financial department might be required to issue the equivalent of a production order for such expenditure by the works, and, in such an event, production oncosts would be included in the costs.

**Cost
Allocation
Routine.**

The cost allocation routine may be resolved into three stages, and it will be convenient to use separate sheets for each stage under the respective order references. This will give a valuable flexibility in the works accounts office arrangements and locate responsibility for accuracy.

The stages should proceed simultaneously to expedite the accounting. The promptitude with which the costing routine can be effected is a vital factor in justifying the compiling of costs and must be a deciding factor in the system adopted. The present proposals will accomplish the necessary promptitude, if properly administered, and at the same time will furnish accurate and complete accounts—not always attained by methods which consider rapidity of result alone.

The stages may be conveniently tabulated as below, together with notes of the medium through which the information as to correct allocation is furnished to the works accounts office. The names of the forms given are not essential any more than a particular size or style of form is essential. The idea is to symbolise the principles

underlying the routine by indicating specific forms with titles as appropriate as possible to their real functions. Cost Allocation Routine.

The stages submitted for the cost allocation routine are founded on a considerable experience, but that is not to say that in every works accounts office the work ought to be or even could be split up in this way. There is, however, likely to be a gain in the smooth running of a complete system of cost accounts if the stages indicated are adopted in principle, if not literally.

Cost Allocation Routine.			
STAGE.	COST ANALYSIS.	MEDIUM OF ALLOCATION.	
I (F 129)	Purchases <i>allocated direct.</i>	<p><i>Goods Received Notes</i> duly completed as to purchase costs from suppliers' invoices, and supported by goods issue vouchers as to actual use of the goods, unless their use can be taken as originally intended when ordering, as in the case of plant.</p> <p>In the case of forgings and castings purchased outside it will be better to treat such purchases under process products along with the firm's own production of forgings and castings and the like.</p> <p>Returnable packages can be dealt with independently—see page 494.</p>	F 82.
	Process Products <i>allocated direct.</i>	<p><i>Product Delivery and Daily Work Sheets.</i> It may be sufficient in many cases to charge according to the original foundry or smithy order, either stock production or sales despatch, and assume that the products are applied in every instance as originally intended. Alternatively, goods issue vouchers will be necessary in each case.</p>	F 71. F 73. F 77. F 78.
	Disbursements <i>allocated direct.</i>	<p><i>Cash Report to Works</i> as to cash disbursements.</p>	F 120.
		<p><i>Weekly Staff Reports</i> duly extended to correspond in total with entries in</p>	F 3.

**Cost
Allocation
Routine.**

Cost Allocation Routine, contd.

STAGE.	COST ANALYSIS.	MEDIUM OF ALLOCATION.
F 121.		cash reports to works. The allocation of the salaries of officials may, if preferred, be indicated on the cash report to works without disclosing names—the total salaries of several officials being merged where possible.
F 86 F 125.	II (F 130.) General Stock Materials <i>allocated from stock.</i>	<i>Disbursements Book</i> , when duly completed as to amounts from the respective debits and demand notes.
F 106		<i>Goods Issue Vouchers</i> or <i>Stock Issue Abstracts</i> duly rated in accordance with the general stock accounts.
F 88.		<i>Departmental Reports</i> , which may be more convenient than goods issue vouchers in the case of fuel, process supplies, paints, building and millwrights' supplies, etc.
F 87.		<i>Timber Tickets</i> , being a special edition of goods issue vouchers, for issues of timber. These may possibly be made out by and possibly rated by the department foreman—in a pattern shop by the pattern checker.
F 86.	Component Stock <i>allocated from stock.</i>	<i>Shop Credit Slips</i> for crediting returns from the shops.
F 53.		<i>Goods Issue Vouchers</i> duly rated in accordance with the rough (process products) or finished component stock accounts.
F 111.		<i>Quantity Slips</i> , which may be used for repetition work when all components are passed into stock prior to assembling.
		<i>Warehouse Daily Report of Despatches from Stock.</i>

<i>Cost Allocation Routine, contd.</i>			Cost Allocation Routine.
STAGE.	COST ANALYSIS.	MEDIUM OF ALLOCATION.	
III (F 131.)	Direct Machine Wages.	<i>Weekly Time Allocation Sheets</i> duly extended at wages rates and production oncost rates. The posting of the wages items under the proper analysis headings will be greatly facilitated by the use of distinctively coloured weekly time allocation sheets.	F 28.
	Direct Hand Wages.		
	Secondary Wages.		
	Overtime Expenses.		
	Production Oncosts.		
	Extra Pay (Machine).	<i>Extra Pay Book</i> in which the earnings are indicated in just sufficient detail for proper allocation.	F 29.
	Extra Pay (Hand).	A carbon copy can be arranged so as to furnish an extra pay notification for each worker concerned.	
	Special Allowances.	<i>Special Allowance Book</i> on the lines of the extra pay book with carbon slips for the workers concerned.	

Emphasis has already been laid on the necessity for accuracy in the cost allocation accounts, and, as a matter of book-keeping accuracy, this means agreement of totals at frequent periods. Cost
Allocation
Agreement.

A fortnight is the period recommended. So far as this may seem a short period to adopt for agreement purposes, in view of the large number of totals to be extracted and added together, it should be borne in mind that mechanical means for figure additions are available, and will go far to make a frequent agreement a matter of ease. It is only by frequent agreement that an all-round accounting accuracy can be maintained, and the best results as to promptitude can only be obtained economically by mechanical means. p. 447.

The process of cost allocation agreement is quite straightforward, and may be at once tabulated.

It will be remembered that the cost allocation accounts, as a whole, have to agree with the works expenditure as recorded in the p. 451.

**Cost
Allocation
Agreement.**
F 115, 116, 117.

works account register. There is, however, in connection with stock material, an intermediate stage whereby the cost allocation of stock goods (Stage II. of the cost allocation routine tabulated above) must be agreed with the stock accounts as to goods issued from stock.

p. 383.

<i>Cost Allocation Agreement.</i>		
COST ALLOCATION STAGE.	COST ANALYSIS	AGREEMENT PROCESS
I	<i>Purchases allocated direct. Process Product. Disbursements.</i>	Totals of cost allocation accounts against totals under respective headings in works accounts register.
II	<i>General Stock Materials. Component Stock Goods.</i>	Totals of cost allocation accounts against total issues entered in the respective stock ledgers (viz. general stock or component stock).
III	<i>Direct Machine Wages. Direct Hand Wages. Secondary Wages. Overtime Expenses.</i>	<p>Totals of cost allocation accounts, under these headings, grouped together in one total against the total wages in the works account register.</p>
	<i>Production Oncosts.</i>	<p>Totals of cost allocation accounts against summary of production oncosts taken from the weekly time allocation sheets (F 28).</p> <p>The accuracy of the production oncosts detail extensions on these sheets can be tested by confirming the total extensions on each sheet.</p>
	<i>Extra Pay (Machine). Extra Pay (Hand). Special Allowances.</i>	Totals of cost allocation accounts against the total extra pay and allowances, in the works accounts register.

VI c

STANDING ORDERS

THE primary function of standing orders is to classify the details of works expenditure under regular headings. They are in essence cost allocation accounts of a permanent or standing character. An alternative term is syllabus orders.

Functions of
Standing
Orders,

Sometimes the standing orders are so comprehensive as to include every item of expenditure, but in the ordinary way their use is restricted to expenditure on works capital additions and works expenses, with the addition of departmental process accounts for iron foundry, brass foundry, smithy, and the like, together with certain works sundry accounts of a nature to be explained later.

While there may be a common usage in regard to the total scope of standing orders, very different ideas prevail as to the scope of the separate orders, or, in other words, as to the classification. The general tendency is towards crudeness rather than refinement in classification, and this can be well enough understood by remembering that the decision as to allocation of cost to the respective standing orders commonly devolves on the foremen.

Considering, more particularly, works expenses, it will be easy to realise that a crude classification must result in accounts of small value for administrative purposes, although there may be enough information to satisfy auditors.

A more elaborate classification of expenses will mean a corresponding increase in the number of cost accounts, and in the number of entries in the financial accounts.

If the foremen are to be used for applying the classification, elaboration will be unfair to them. As a matter of fact it is altogether undesirable that any foreman should be brought into the question at all, firstly, because cost allocation is not his proper business, secondly, because his obvious limitations in the matter ought not to be allowed to handicap the development of the classification, and lastly, because open accounts of this character make it almost impossible to efficiently control the works expenses.

**Functions of
Standing
Orders.**

F 129, 130, 131.

It ought to be a starting point in drawing up a set of standing orders that it is not what the foremen can be expected to do, or what number of accounts may be permissible, but rather what classification of works expenses is necessary to give the most useful figures for administrative purposes, and also the most useful figures for the calculation of production oncost rates.

p. 416.

In the case of works capital additions there is another consideration, namely, the best grouping of plant values for the equitable application of average depreciation rates as necessary for financial reasons.

The classification of expenditure for works capital additions should in turn have its complement in connection with works repairs so as to furnish useful ratios of one to the other for administrative purposes.

In any case, however, an undue multiplicity of classes, or accounts, must be avoided.

p. 412.

There are serious objections to the common practice of issuing standing orders to the shops for booking of time and material. The first objection is the resulting inaccuracies of allocation arising from ignorance and carelessness, if not intentional deception. Another objection is the absence of control by the management and a third the resulting absence of detail information whereby efficiency can be stimulated.

To meet these objections, shop or job orders are advised in conjunction with suitable arrangements for collating the costs as allocated to these job orders, under the appropriate standing order.

The job order system has obviously even stronger claims to consideration in connection with works capital additions, to guide the valuation of capital assets.

F 96. The job orders for these purposes of works additions and repairs may be conveniently designated plant orders, under separate references such as N 1, etc. for additions or new work, and R 1, etc. for repairs. Alternatively, both series might be termed job orders with similar references, or perhaps WA 1, etc. for works additions, and WR 1, etc., for works repairs. Tools may advisedly F 59 be the subject of a distinct series of tool orders.

To take away from the foreman his freedom of action regarding works repairs will not be favourably viewed by him. He will have legitimate ground for complaint if the routine established to exercise control and get repairs put in hand is not carefully devised and administered with intelligence and promptitude. The appropriate routine for this purpose is discussed in connection with the control of repair expenditure—page 412.

Experience of the tremendous savings, actual and proportionate, resulting from the withdrawal of standing orders from the shops and the institution of specific orders for each and every expense job, amply justifies the advocacy of these measures despite the first opinions of the foremen and the extra stress on the administrative staff.

If the principle of specific plant orders for works capital additions and works repairs be adopted, a very simple compromise will meet the case of minor repairs and plant attendance that consist of a succession of jobs too small, for the most part, to justify individual orders. These cases are very well met by the issue of fortnightly orders corresponding with the standing orders concerned or subdivisions of them. These short term orders should specify clearly the duties covered, else they may be interpreted to cover a multitude of jobs outside the intention of the order.

A convenient routine lending itself to efficient shop management and accuracy in cost allocation is for plant stoppage reports to be issued as and when a machine requires attention from the millwrighting or engineers' department. p. 412.

A convenient method of numbering the standing orders is by the use of "hyphen" or "dash" numbers, a group number being followed by a series number—and the combination preceded by a letter symbol, such as

N for Works Additions.
R „ Works Repair Expenses.
S „ Works General Expenses.
U „ Works Sundry Accounts.

DEPARTMENTAL PROCESS ACCOUNTS.

G for Iron Foundry.
H „ Brass Foundry.
K „ Smithy.

The schedules given in the following pages follow this scheme of numbering.

So far as possible the groups consist of related classes of expenditure. There can be any number of classes or accounts under the same symbol reference, and additional accounts can be opened without disturbing the group sequence.

The extent to which the respective standing order accounts

**Numbering
of Standing
Orders.**

should be subdivided must depend on local conditions and requirements.

Where departmental subdivisions are necessary, there is the less likelihood of other subdivisions being necessary, and it will be admissible to add a letter symbol representing the department, thus S 6-2A—Departmental Sundries for Department A.

In attempting to detail a representative list of standing orders, no pretence can be made as to their suitability for every works, but some useful purpose will be served by discussing a list that is founded on actual experience in a number of works in this country.

**Works Capital
Additions.**

In the case of works capital additions, the standing orders will not apply so much to the cost accounts themselves as to the sum-
F 137. marising of the plant order costs, and their grouping for purposes of depreciation. Consideration of the interpretation to be placed on the suggested standing orders is dealt with, therefore, under Plant Records, page 400.

The following is a representative list of standing orders for works capital additions, having in view the needs for determining depreciation rates on reasonably accurate lines, for arriving at equitable production oncost rates, and for efficient administrative control generally.

*Works Capital Additions—Representative Standing
Orders.*

N 1-1	-	-	Additions—Drawings and Patterns.
N 1-2	-	-	„ —Jigs, Special Tools and Gauges.

N 2-1	-	-	Additions—Land and Buildings.
N 2-2	-	-	„ —Motive Power Plant.
N 2-3	-	-	„ —Mechanical Transmission.
N 2-4	-	-	„ —Electrical Transmission.
N 2-5	-	-	„ —Pipe Transmission.
N 2-6	-	-	„ —Transportation Plant.
N 2-7	-	-	„ —Shop Fixtures.
N 2-8	-	-	„ —Special Process Plant.
N 2-9	-	-	„ —Machines.

N 3-1	-	-	Additions—Loose Plant.
N 3-2	-	-	„ —Office Equipment (Works).
N 3-3	-	-	„ —Office Equipment (General).

The last named account is included for convenience in accounting, but the works accounts will only deal with expenditure under this head that refers to work actually carried out in the works.

The standing orders suggested below for *works repair expenses* are parallel to those for works capital additions. This arrangement provides for computing the ratio of repair expense to plant values under the respective headings.

Attention is called to the fact that the term "maintenance" is rigidly avoided in connection with plant expense (except for patterns, jigs, special tools and gauges) because its meaning can be made to vary so much. Considered in its fullest sense, maintenance includes repairs and attendance. Separate accounts are recommended for attendance (S 2-1, S 2-2, S 2-3, S 2-4, and S 2-5) which will be found to give added value for administrative purposes to both sets of figures.

The question of renewal expenses has been considered in connection with additions. Building and fixed plant renewals should be dealt with under special plant orders and finally allocated on the merits of each case to additions, alterations (S 2-6) or repairs, excessive cost on additions should be written back (U 3-4, p. 497). Loose plant and office equipment renewals will be, in the first instance, allocated as repairs, as being subject to annual valuation, which will automatically adjust matters as to the effect on capital values.

The range of items falling under the respective "repairs" standing orders are set out under the parallel set of "additions" standing orders on page 400.

Works Repair Expenses—Representative Standing Orders.

R 1-1, Repairs—Patterns.

R 1-2, Repairs—Jigs, Special Tools and Gauges.

The charges falling under these two accounts may be derived in part by transfer from the pattern and special tool maintenance costs under various production orders, which it may be decided to relieve in this way.

Maintenance is conveniently used here as covering any upkeep expense after the initial expenditure for making, but not such matters as storage and handling.

R 2-1, Repairs—Land and Buildings.

A separate sub-account for each building—particularly the power building, if any, is strongly desirable to guide apportionment for oncost purposes.

Works Capital Additions.

Works Repairs.
p. 412.
p. 540.

p. 484.

p. 410.

F 137.

**Works
Repairs.**

Some discrimination will be necessary as to certain expenses, such as painting, whether they shall be dealt with here as repairs or under building attendance (S 2-1).

Painting and tarring that is done to preserve the fabric are clearly repairs. Painting done to improve the lighting capacity should also be included here, but the cleaning of same treated as building attendance.

It may be remarked that a clean white surface will reflect some 80 per cent. of the light and almost equals mirrors in lighting efficiency—good mirrors reflecting 90 per cent. of light.

In the case of washable distempers lasting two or three years, the initial cost can be treated, like painting, as repairs.

Ordinary limewashing is clearly a building attendance expense.

R 2-2, Repairs—Motive Power Plant.**R 2-3, Repairs—Mechanical Transmission.****R 2-4, Repairs—Electrical Transmission.**

Under most conditions there will be little advantage in attempting separate sub-accounts for each department concerned under the above headings.

For production oncost purposes the costs under these accounts can be considered as pertaining to power service, and consequently can usually be fairly apportioned to departments on the basis of power consumed.

R 2-5, Repairs—Pipe Transmission.**R 2-6, Repairs—Transportation Plant.****R 2-7, Repairs—Shop Fixtures.**

For production oncosts purposes the above three classes of expenses are included in building service, and apportionment to departments on the basis of replacement plant values is suggested.

It may, of course, be better in some cases to keep departmental sub-accounts in each class.

R 2-8, Repairs—Special Process Plant.**R 2-9, Repairs—Machines.**

In connection with these two accounts, departmental divisions will probably be desirable, particularly as regards special process plant.

Judgment will be necessary as to whether to use such departmental figures for production oncosts purposes or to apportion the total expenses on the basis of replacement values of plant.

Works
Repairs.

p. 540.

R 3-1, Repairs—Loose Plant.

All tools other than jigs, special tools and special gauges are included here.

p. 403.

p. 425.

Renewals are included here without the scrutiny necessary for fixed plant additions because the capital value of loose plant is derived from an annual inventory.

• Attention is called to the separate account (S 2-5) proposed for tool dressing and sharpening expenses, which are not deemed to be repairs within the meaning of this account.

A further point may be made as to what may be called "consumable tools," such as brooms, brushes, files, etc. While these for inventory purposes come into loose plant, it will be better that, during the year, they shall be treated as departmental sundries and charged to a suitable account (S 6-2) as drawn from stores.

Separate sub-accounts for each department may be useful, but apportionment of the total expenses on a departmental replacement value basis will probably be more accurate for oncost purposes.

R 3-2, Repairs—Office Equipment (Works).

p. 432.

A parallel to departmental sundries in relation to loose plant exists here on a minor scale in respect to certain stationery items, such as cardboard filing cases, index guide cards, rubber stamps, etc. They should be charged to a separate account (S 3-4) during the year, and the items in use possibly enumerated in the annual inventory, though there are limits to what is worth while doing in that direction.

No provision has been made above for repairs to office equipment (general). These are not works expenses, and are, therefore, kept out of the sequence of works expense standing orders. Some provision is, however, necessary for works accounting purposes, and this will be found in the works sundry accounts group under repairs to office equipment (U 1-2), page 493.

The remaining works expenses to be provided for are termed **Works General Expenses** in contradistinction to works repair expenses.

**Works
General
Expenses.***Works General Expenses—Representative Standing Orders.***S 1-1, Power Generation Expenses.**

p. 543.

This will include all wages of boiler house and engine house staff.

Similarly, all power supplies, such as fuel, water, oil, etc., will be included.

p. 366.

Unless fuel is bought at very frequent intervals, it is better to consider it as stock and to charge this account, say fortnightly, with the fuel used on the basis of a power report.

Fuel handling should be charged direct here, or added to the cost of the fuel.

The influence of repair expenses and depreciation on the cost of generating power is recognised in dealing with power service in connection with production oncosts on page 537.

S 1-2, Power from Outside Sources.

This will include the cost of power bought in bulk from outside companies or authorities. If for lighting purposes only, the cost may be charged to lighting expenses (S 1-4) in the first instance, to save transference afterwards.

S 1-3, Heating Expenses.

These costs are usually distinct to an extent, if not entirely, from those of power generation.

Whatever heating expenses can be differentiated in the first instance should be debited to this account.

Transfers from other accounts can be made, if thought necessary, to make the charges against this account inclusive. This will be helpful in determining oncost rates.

S 1-4, Lighting Expenses.

The remarks above as to heating expenses apply equally to these expenses.

S 2-1, Building Attendance.

This has reference to work on and about buildings that can hardly be called repairs—see R 2-1.

Limewashing, cleaning roof lights and other windows, and yard sweeping are instances.

The charges under this account will probably be small, but the separation will be useful for the sake of keeping other accounts clear.

S 2-2, Mechanical Plant Attendance.

Works
General
Expenses.

This will include more particularly such expenses as oiling shafting and cleaning machinery.

It will be a reasonable refinement to debit to this account the usual 10 to 15 minutes spent at the end of each week by each machinist in cleaning down his machine, rather than that this expense should be hidden by being borne by the particular orders in work at the moment.

S 2-3, Electrical Plant Attendance.

This will cover the electrician's time round about the works giving attention to matters that are more in the nature of oiling and cleaning than repairs.

S 2-4, Belting Attendance.

p. 402.
p. 428.

This account will include all belting expenses, except the initial one when a machine is installed, which may be charged either to works additions—machines (N 2-9) or works additions—loose plant (N 3-1).

Wages charges in connection with belting will be included as well as materials.

S 2-5, Tool Dressing and Sharpening.

This will include toolsmith's wages dressing tools, and all expenses of sharpening.

The first sharpening of new tools will obviously go in with the cost of making.

This account is very useful, when tool sharpening is undertaken by the departmental tool stores, to keep these expenses separate from tool serving.

S 2-6, Plant Removals and Alterations.

p. 401.
p. 410.

This account includes the cost of what are sometimes termed improvements but which do not justify any increase in capital values.

The costs will be derived by transfers from the plant order cost summary.

F 137.

Separate sub-accounts are necessary for each department affected.

Alterations to meet Home Office Factory Inspector's requirements, should be charged here.

p. 195.

**Works
General
Expenses.**
p. 264.

§ 3-1, Rent, Rates, Taxes, Fire Insurance and Prevention.

The scope of this account will be sufficiently obvious.

In regard to fire prevention, there may be works fire brigade expenses to be met.

p. 27.
p. 437.

§ 3-2, Works Management and Administration.

This will include the salaries of such staff as works manager, and the staff working immediately under him for production estimating, production regulation and the like, together with the works accounts office staff.

General stores and warehouse staff will be included under standing order S 4-1, and work depot staff under S 6-1.

Works correspondence expenses and telephone fees are chargeable here.

Stocktaking expenses should be included here, though probably collected under a special order.

p. 27.

§ 3-3, Drawing Office General Expenses.

F 3.

This will include staff time and expenses that cannot conveniently be allocated to specific production orders.

In the case of tool designing when done in the works office or other place away from the drawing office, any time not allocated to orders may be included here, or alternatively to S 3-2.

In the matter of drawing office work on preparing estimates, catalogues, and the like, if of appreciable amount, such expenditure should be charged to commercial expenses (U 1-1).

All photo-printing expenses and all drawing office materials will be included here.

Economy will probably result in many cases if drawing office materials are properly stored and issued in suitable regular quantities.

§ 3-4, Works Stationery.

This account is intended to cover all stationery, books and printed forms pertaining to the works administration, apart from drawing office materials.

p. 314.

Proper storage arrangements and control are strongly recommended.

§ 3-5, Sundry Minor Expenses.

This is a miscellaneous account which can hardly be avoided

It will include such items as the wages of works patrols (gatekeeper, watchmen, etc.) and messengers, holiday and camp allowances to apprentices and others, apprentice instruction expenses, and mess-room expenses. Works
General
Expenses.

In regard to the last named, if the firm run the mess-room or canteen and handle the takings, special accounts will be necessary.

S 4-1. General Stores and Warehouse Expenses.

The separation of the warehouse from the general stores is not always convenient, though generally desirable—the general stores receiving all materials bought and the warehouse despatching all goods sold.

Sub-accounts should be kept for each when the distinction is clearly made. Packing materials, such as brown paper, wood, wool, etc., would be chargeable here as warehouse expenses.

A further sub-account may be necessary in respect to the cost of maintaining unsold product in a saleable condition. See remarks under standing order U 1-1, page 492.

S 4-2. Sundry Carriage and Packing Expenses.

This should not be other than a small account, as every effort should be made to allocate expenses of this character to the purchases or sales concerned.

There may be a debit at the end of the year in respect to losses on packages. See standing order U 3-1, page 494.

S 4-3. Material Testing and Treatment.

This account is particularly susceptible to local conditions, as to the items to be included, and various sub-accounts will often be found necessary.

Material testing expenses of a general character, and not therefore chargeable to any special order, may arise from tests carried out to guide design or purchasing.

Laboratory general expenses, where such a department exists, would be included here as a sub-account.

The term material treatment is intended to cover the costs of such processes that cannot satisfactorily be allocated in any other direction.

Heat treatment, annealing, casehardening, cutting off bars in stores may be cases in point. Separate sub-accounts under each heading would then be necessary.

p. 500.
p. 553

**Works
General
Expenses.**

It is, of course, sounder practice to treat these as intermediate process accounts (Section VI d) when the amount of expenditure warrants it.

p. 377.
p. 553.

S 4-4, Timber Preparation and Storage.

This is in the nature of material treatment, but when it occurs at all, is usually important enough to require a separate account.

In any case special treatment is necessary as regards the distribution of these expenses.

S 4-5, Interdepartmental Transportation.

This has reference to the cost of handling work between departments. It may be a heavy account under some conditions and include transport by mechanical or electrical means, motor vehicles or horses.

S 5-1, Accident Compensation.

This will be mainly a matter of the employers' liability insurance premium payments, though there will be ambulance expenses to be included.

Time lost in consequence of an accident will be charged here.

S 5-2, National Insurance Expenses.

This is a works expense consisting of a compulsory contribution to the State per person employed. The contributions have reference to health insurance and, in most trades now, to unemployment insurance also. A certain rebate is allowed in the latter connection in respect to men employed for 45 weeks in the year by the same employer, and should be credited here.

S 6-1, Departmental Stores Expenses.

This will include pattern stores, works drawing stores, tool stores and work depot, but not include sub-stores of the general stores.

Pattern stores expenses are not uncommonly treated as chargeable to the pattern shop, as general labouring.

So far as is feasible, separate sub-accounts should be kept for each department.

288.

S 6-2, Departmental Sundries.

This account includes the materials requisite for shop use which do not enter into the product. These are sometimes called "non-productive" or "indirect" materials. A

better description is that of "auxiliary" material. Certain of such supplies are charged to appropriate expense accounts, *e.g.* to power generation expenses (S 1-1). See also process accounts, standing orders G 2-2, H 2-2, K 2-2. The present account provides for sundries of general shop use. Separate sub-accounts will be necessary for each department.

**Works
General
Expenses.**
p. 504.

Departmental sundries are sometimes allocated to a specific production order, for commercial reasons, as secondary material, for instance, in connection with customers' repair orders. Provision may therefore be made on the cost allocation sheets for separating out such allocations from those for ordinary direct materials. Some definite routine will require to be established by which the foreman in drawing out departmental sundries shall indicate when a production order is chargeable.

p. 305.
p. 465.

From a cost accounting point of view, the fewer charges to production orders the less clerical work and the more consistency there will be in the period totals of this account.

S 6-3, Overtime Expenses.

p. 250.
p. 466.

This account will cover any unallocated overtime expenses such as when overtime results from a general congestion of work in the shops.

In any case this account will be restricted to overtime allowances on direct production labour.

The overtime allowances on auxiliary or "oncost" labour F28, will be allocated with the labour itself.

Departmental sub-accounts will be necessary.

S 6-4, General Labour.

This has reference to such labour in the shops that cannot satisfactorily be allocated to production orders.

The principal items will be that of moving work about the shops by hand or by mechanical means.

The individual help necessary for machines on particular classes of work, such as heavy machine work or erecting, may be charged direct to the order concerned or to this account as local considerations may determine. Any allocation to production orders should be included under secondary labour in the cost allocation accounts, so as not to be confused with direct machine and hand labour.

p. 466.

There will be other miscellaneous items such as sweeping shop floors.

Works
General
Expenses.

Another case is that of unallocated wages in connection with groups of machines under single operators. If the operator's wages be assumed as always spread over two, three or four machines there may be occasions when one or other machine is idle. To attempt to adjust the divided wages rate adopted for costing purposes to meet such events means holding up the cost allocation until the end of the week, and does not give any improved accuracy in the allocation. The alternative of a regular divided rate may mean a small balance of unallocated wages to be charged to this account.

p. 504.

Departmental sub-accounts are necessary. In the case of departments subject to process accounts, these expenses will be charged to the respective sub-sections of those accounts (Standing Orders G 2-4, H 2-4, K 2-4).

S 6-5, Supervision and Inspection.

This account will cover supervision that is obviously of a general character, as in the case of a head foreman.

F 3.

In the matter of foremen not wholly engaged on supervision, only a proportion of their wages will be charged here.

The more ordinary conditions that require consideration are those where the assistant foreman, or chargehand, is engaged in helping the different workers—distributing the work and seeing that each man is properly started on the different jobs. This might almost be treated as an operation, so intimately is it bound up with the individual jobs. While, therefore, there is no objection in principle to charging the particular production orders with the time consumed in this way, still the difficulty of so doing is almost as much as there would be with the cost of moving work about the shops.

p. 466

When it is preferred that this time should be allocated to production orders as secondary labour, instead of being treated as an expense under this account, the basis of allocation should be derived from the wages allocation of the men in the department rather than on some approximate time sheet made up by a chargehand.

In the matter of inspection expenses to be included in this account, the conditions are closely parallel to those pertaining to supervision.

If the inspection in question is inspection between operations or groups of operations—alternatively known as viewing or examining—the difficulty of correct allocation may be

greater than when only the final examination of finished articles is in question.

The quantities of work and the nature of the operations will affect the considerations so much as to make useless any attempt at defining a method of time allocation suitable for every case.

A computed allocation by the works accounts office on the basis of the departmental wages allocation may be quite satisfactory in many cases.

Sometimes each viewer can be called upon to make out a daily list of work passed, and allocation based directly on this list.

Departmental sub-accounts are requisite here.

S 6-6. Unproductive or Waiting Time.

The object of this account is to bring into prominence what may be termed unproductive or waiting time, the aim being to focus attention on the cause with a view to its removal. Under a time work system this account is not likely to be much used, but, where payment is by results, most valuable information regarding weakness of organisation and administration can be obtained which, if carefully used, will make for appreciable economy.

The amount of unproductive time in any works—using the term unproductive in its literal sense—is usually more than is realised, and without arrangements are made for such to be shewn in the accounts or records, it is likely to remain hidden.

The following are a few of the causes of unproductive time :

Unbalanced plant.	}	<i>Plant.</i>
Breakdown of machine.		
Unsatisfactory handling of existing cranes.		
Shortage of cranes.		
Poor tool store facilities.	}	<i>Tools.</i>
Insufficiency of tool supply.		
Sufficiency of work, but not properly regulated and looked after.	}	<i>Work.</i>
Shortage of Work.		
Inattention of foreman.	}	<i>Supervision.</i>
Inattention, incompetency, or insufficiency of machine setters.		

**Works
General
Expenses.**
p. 121.

Apart from its use as described above, provision is necessary, as a matter of equity, for the recognition of compulsory unproductive time when workers are paid by results, it being right in principle to book against a particular job rate only that amount of time which has afforded opportunity for the worker to produce. Delays occasioned by circumstances outside the worker's control should not be paid for by the worker himself out of the extra pay which would otherwise have been earned. To make allowances for such delays and have no arrangements whereby the same can be reviewed as a total is, however, but to encourage waste and inefficiency.

Separate sub-accounts are necessary for each department concerned, and analysis should be made of the costs arising from the respective causes, which may be condensed under such headings as Plant, Tools, Work, Supervision, as indicated in italics above.

**Works
Sundry
Accounts.**

There are certain classes of expenditure, not yet dealt with, for which it will be convenient to provide standing orders. These may advantageously be grouped together as works sundry accounts, and possibly distinguished by the letter U.

Works Sundry Accounts—Representative Standing Orders.

p. 472.

U 1-1, Expenditure Chargeable to Commercial Expenses.

This will serve to collect the minor services rendered by the works from time to time on behalf of the commercial departments.

A typical item will be demonstrations in the works for publicity purposes.

Special orders are desirable for exhibitions and competitions, but the costs may be transferred here if desired.

Drawing office work in connection with commercial estimates and catalogues should possibly be charged here.

This account may also include the expenses of putting into saleable condition goods returned by customer. It is assumed that the works will be debited through the financial books with these returns at the same stock price as if new. The cost of restoration, therefore, pertains to the commercial expenses incidental to selling.

The cost of maintaining unsold unfinished goods in saleable condition can be interpreted possibly as a commercial expense, though the reason for not selling may not always be laid to the charge of the selling department. It may be due to late delivery, high cost, bad design or bad workmanship. In such event the costs may be better allocated

to warehouse expenses (S 4-1) as an item of general Works
works expenses, to be provided for in the production oncost Sundry
rate. Accounts.

The works costs, as reported in the works cost allocation
abstracts, will be duly debited to the *Commercial Expenses* F 162.
Account in the financial books, thus, in effect, relieving or p. 567.
crediting the works profit and loss account accordingly. F 164

U 1-2, Repairs to Office Equipment (General).

This account might have been included as a sub-account p. 404.
under the previous heading (U 1-1) except that its connection
with capital values makes prominence desirable.

The corresponding capital additions account is N 3-3,
which is included for convenience in the works series.

It is supposed that only expenditure in the works on ac-
count of repairs will be included here.

In the case, for instance, of repairs to a typewriter executed
by an outside firm, there is no necessity for the invoice to
come through the works accounts, that is when the said
typewriter is used in the general offices. On the other hand,
no confusion need arise if such an invoice should be passed
through the works accounts—the item would be duly allo-
cated here, and the works profit and loss account accordingly F 164,
adjusted as a consequence.

U 2-1, Scrap Stock Values.

p. 379.
p. 600.

This account will serve for aggregating the debits that are
necessary in the cost allocation accounts to balance the
credits allowed for scrap returned from the shops.

The debits in question represent the value that the
scrap is considered to be worth or will realise when sold
—in that way it becomes possible to view this account
as the cost account of the scrap produced in the shops,
in the sense only that the works values adopted are recorded
in total in the cost ledger as material costs.

Although the scrap in question will presumably have been
put into stock, the stock accounts can only be debited through
the medium of the works product notes duly entered in the F 108.
finished stock product summary under two headings, as to F 119.
the scrap that has been credited to production orders and the
scrap that has not been so credited.

The respective totals for each account period are duly
reported to the financial department on the works product F 161.

**Works
Sundry
Accounts.**
p. 567.
p. 571.

abstracts. From this abstract the *Works Materials Suspense Account* in the financial books is debited. This transaction may be said to confirm the entries made in the works accounts register as to their application to the stock accounts concerned.

In debiting the *Works Materials Suspense Account*, the financial accounts are balanced by crediting the *Sales Orders Accounts* or *Stock Production Account* on the one hand, as to scrap credited to orders, and the *Scrap Account*, on the other, as to scrap not credited to orders.

This *Scrap Account* constitutes an apparent profit, although really representing an over-allocation of material costs against orders.

F 164.

The amount under the *Scrap Account* is duly embodied in the *Works Profit and Loss Account*, which has the same ultimate effect as if the order costs had been adjusted.

U 3-1, Returnable Packages Suspense Account.

p. 459.

This account will be debited with the fortnightly totals of returnable packages invoiced, and will be credited with the packages returned. The necessary totals will be derived from the works accounts register.

A package is to be understood as meaning packing case, crate, barrel, can, bag, wrapping or other medium used to hold or protect goods in transit.

This is strictly a works suspense account, and any balance at the end of the year, not represented by packages in stock, will be transferred to sundry carriage and package charges (S 4-2) Special attention should be given to returning, before stocktaking, all packages that it is intended to return.

p. 295.

If the practice advocated of dealing with suppliers' packages is adopted, there should be no danger in leaving the survey of stock and necessary adjustment of package losses until the end of the year. Failing that, a clearing up several times a year will be necessary.

The practice in question is particularly satisfactory when suppliers' packages are occasionally used for despatching sold goods, because the item is automatically marked off on the respective supplier's package account.

Whether the cost of packages so used should be credited to the suspense account under consideration, and debited to the particular sales order for which used, must depend on circumstances.

A striving after too great an accuracy in that direction is likely to give far more trouble than the results will be worth. **Works Sundry Accounts.**

The essential point is to invoice the package used to the customer, if that is the firm's practice.

For the rest, so long as the packages themselves are efficiently looked after, the cost accounts need not be burdened with the record of their coming and going.

Further, this arrangement will obviate the works being debited through the financial accounts with every package returned by customers.

If the package returned were one for which the cost of making had been charged to a specific sales order, then the works will be a little to the good by having the package returned without incurring a corresponding debit.

In other cases, the works will be the losers by reason of packages not being returned that have never been charged to the sales order in question.

To complete the consideration of package problems here, reference is necessary to packages that are made for continuous service, such as between the works and outside foundries. In these cases the original cost should be allocated to works additions—loose plant (N 3-1).

Any used package, that is not returnable to a supplier, may be considered at stocktaking as loose plant.

Reserve stock of new packages would be treated as general stock.

This will remedy any confusion between suppliers' packages, and sales packages, or packages used for the despatch of goods.

Considered as a strict system of accounting, these proposals would be unacceptable, but, when coupled with a system of control, the compromise will be found expedient in many businesses.

As a matter of efficiency, the method of control is more important than the method of accounting. The absence of complete entries in the cost accounts of the peregrinations of packages is not intended to serve as an excuse for needlessly losing the value of even one package.

p. 403.

U 3-2, Expenditure Suspense Account.

This account is provided to deal with expense payments that cover a longer period than the fortnightly works cost allocation abstracts do.

p. 563.
p. 574.

**Works
Sundry
Accounts.**

Take the case of insurance premiums (fire and employers' liability) which are paid in advance for the whole year, though subject to adjustment at the end of the year. To debit the whole amount paid in one fortnight's expense accounts is to throw the figures for the succeeding periods all out of balance.

The disturbing effect will vary under different sets of conditions, but it is not much good surveying expenses at short periods if there is no consistent basis for the expense figures.

The argument could apply to such matters as printed forms and books, or, again, to the expenses pertaining to handling and stacking stock goods when bought in quantities to last a considerable time.

Local circumstances must determine how far it is advisable to use this suspense account.

The method of use is to allocate the expenditure charges as they come through and transfer fortnightly the amounts under each heading chargeable to the current fortnight's expenses. For some items the transfers may for a time anticipate the expenditure charges.

Instances in the latter category are rent, rates and charges for outside power.

Monthly salaries may be possibly considered in this connection when fortnightly account periods are in use.

F 132. All expenditure included in this account must be fully dealt with in the cost ledger by transfers to other accounts by the end of the year, so that the balance on the account represents items either not invoiced or invoiced in advance. These items will be reported in the works accounts annual abstract, for adjustment accordingly in the financial accounts.

It will be very necessary to have sub-accounts for each class of expenditure dealt with through this suspense account.

F 134. A memorandum account will also be desirable in the production oncosts book.

U 3-3, Cost Allocation Differences Account.

p. 575.

This account will deal with the adjusting entries necessary to balance differences in the costs allocated as compared with the expenditure to be accounted for.

In the case of materials charged direct and also of disbursements, it may be assumed that no differences will be passed, but even in those divisions there may be items

to be carried over from one account period to the next for **Works Sundry Accounts.** agreement purposes.

In the case of stock accounts some minor differences will probably have to be condoned between the allocation totals, as extracted from the cost allocation accounts, and the totals **F 130.** of issues credited to stock according to the stock ledger. **F 123.**

The stock accounts may also be adjusted through the medium of this account in respect to actual errors in stock disclosed by the stock scrutiny—in the case of a shortage, debiting this account and crediting the stock account concerned by a suitably authorised goods issue voucher. A surplus on the stock account would be adjusted as if it were a return of material from the shops, or in other words, as a cancelling entry on the issue side of the stock ledger. **p. 373.**

In the matter of wages allocation some minor differences **F 131.** are almost inevitable, though a very high standard of book-keeping accuracy is easily attainable. There will occasionally be errors in the making up of wages to be carried over from one week to the next. Penal deductions from wages that are not balanced by reducing the wages allocation can be balanced by crediting this account.

Separate sub-accounts corresponding with the divisions of the cost allocation accounts are necessary.

Any balance there may be on the several sub-accounts **p. 563.** each half-year and year end will be transferred to the production oncosts supplementary account.

U 3-4. Works Additions Costs Written Back.

This account is provided to deal with any works additions costs considered excessive, and to meet the case of those firms who do not agree with the practice of applying production oncosts to works capital additions and experimental orders, which have, therefore, if applied to give more accurate production costs, to be written back or cancelled to meet financial account requirements. The excess costs or oncosts in question are transferred to this account, and written back through the production oncost book by the totals being included in the production oncosts supplementary account. **F 137.**

**p. 407.
p. 410.
p. 471.**

p. 563.

U 3-5. Discarded Plant Stock Values.

This account is provided to meet the case of unsold discarded plant that has necessarily to be credited at a suitable price—usually scrap price—to the works capital additions account concerned, and requires to be debited to stock. **p. 411.**

**Works
Sundry
Accounts.**

It is not desirable to deal with such plant material in the same way as ordinary stock, because of the difficulty of recording its consumption.

p. 559.

To obviate this necessity a discarded plant stock account is opened in the production oncosts book, and the necessary adjustments are made there in respect to losses in stock value disclosed at stocktaking. The figures for this stock account will be collected under the standing order under discussion.

p. 563.

Should any item of discarded plant be sold later or its use on a specific plant order reported, this standing order would be credited accordingly, and the sales or plant order debited, thus reducing the balance to be considered at the year end in the production oncosts supplementary account.

**Process
Accounts.**

The question of cost allocation headings requisite for departmental or intermediate process accounts, such as for iron foundry, brass foundry and smithy, is discussed at length in Section VI D, and a table of appropriate standing orders is set out on page 504, with notes as to their application. For the present purpose, therefore, it will be sufficient to enumerate merely the titles of the standing orders in question.

*Departmental Process Accounts—Representative
Standing Orders.*

	Iron Foundry.	Brass Foundry.	Smithy.
Metal Costs - - -	G 1-1	H 1-1	K 1-1
Fuel - - -	G 2-1	H 2-1	K 2-1
Departmental Sundries	G 2-2	H 2-2	K 2-2
Overtime Expenses -	G 2-3	H 2-3	K 2-3
General Labour -	G 2-4	H 2-4	K 2-4
Departmental Staff -	G 2-5	H 2-5	K 2-5
Transportation - -	G 2-6	H 2-6	K 2-6
Fettling, Pickling and Annealing - -	G 3-1	H 3-1	K 3-1
General Preparations -	G 3-2	H 3-2	—
Waiting Time - -	G 3-3	H 3-3	K 3-3
Defective Product -	G 4-1	H 4-1	K 4-1
Ascertained Metal Losses	G 4-2	H 4-2	K 4-2
Direct Wages - - -	G 5-1	H 5-1	K 5-1

VI D

DEPARTMENTAL OR INTERMEDIATE PROCESS ACCOUNTS

(CASTINGS AND FORGINGS)

A PROCESS account has reference here to an account covering the entire production costs of any process product, which, as a term, is adopted for describing the product of an isolated process. It has reference for the most part to the product of intermediate processes as distinct from the complete manufacturing process, although the underlying principles are the same. A process is a cycle of operations, though it is quite often used to describe a class of operation. By taking the definition of process as a cycle of operations and qualifying it as meaning the whole cycle of operations pertaining to one department, a definition suited to the present purpose is obtained. Thus a casting is held to be a departmental or intermediate process product in the sense that it is the outcome of the whole cycle of operations in the foundry. A forging is another example, while stampings may be considered with forgings as being a type of die made forgings.

Purpose of
Process
Accounts.

Coppersmith's work is sometimes treated as process product. Case-hardening, galvanising and electro-plating are also processes within the meaning intended here.

It is intended to discuss in detail only the accounting and allied routine in connection with castings and forgings. Coppersmith's work may be dealt with on the same lines as forgings. Galvanised and plated work are analogous to brass foundry castings, though the basis of weight cannot be equally utilised.

Galvanising more usually has reference to heavy articles, and it may not be too difficult to discriminate between the rates for different classes of work according to the time required for the operations of pickling and dipping.

In considering the process of plating, the operations of polishing, that precede the plating, and of mopping, that follow it, require to be included, rather than be faced with the alternative of booking

**Purpose of
Process
Accounts.**

this time to the different orders. When payment by results applies to any of these operations, it will be a simple matter to allocate the wages accordingly. The variety of work may very well be compared with the case of brass castings. A weight basis is hardly likely even to be considered for plated work, and the solution may be most readily reached by first expressing each variety of plated work in terms of area plated, adopting some convenient area as an area-unit of product. After doing that it is a simple matter to divide the total cost of plating for a given period by the number of area-units of product.

The extent to which the cost of polishing prior to plating follows an area basis depends usually on the uniformity of the work treated. By resolving the costs into average cost per area-unit, the basis is provided for intelligently estimating the cost appropriate to the various lines of product.

p 487.
p. 553.

Turning to case-hardened work, there may be businesses where it will be feasible to treat this on the lines discussed for plated work, but not infrequently, case-hardening costs will have to be treated as a production oncost item. The resulting errors in the individual component costs may be remedied in making up finished component rates by an estimated allowance for case-hardening. The difficulty is to know on what basis to estimate. The best way usually is to calculate how many of a certain line of articles could be handled for case-hardening in, say, a fortnight, and to then divide the whole normal costs for a fortnight by this figure. If this is tried out for a few typical lines, enough data will be available to estimate quite nearly enough for all sorts of articles.

In proceeding to consider process accounts for castings and forgings, it will help understanding to define briefly some of the terms used.

Process Product Rate.—Alternatively casting rate, forging rate ; this has reference to the works value of the product, in other words, the production cost, either per unit of weight or quantity.

Metal Charge.—That portion of the process product rate covering the cost of metal.

Process Charge.—That portion of the process product rate covering the general process costs other than metal.

The unit product rate in the case of the brass foundry is built up of the two factors :

- (1) Metal charge,
 - (2) Process charge,
- each expressed per unit of product.*

In the case of the iron foundry and smithy, the direct labour costs and the production oncosts appropriate to same are excluded from the process general costs, so that to the unit process charge in these cases must be added the following :

- (3) Direct labour charge, *i.e.* direct wages per unit of product.
- (4) Production oncost charge, *i.e.* production oncost per unit of product appropriate to the direct labour charge.

There will be no occasion to give this distinctive treatment to the direct labour cost if same can be satisfactorily allocated on the same basis of weight of product as used for arriving at the process rate.

The order in which the present subject is discussed has been designed to demonstrate on the one hand the similarity of principles applicable to process accounts for iron foundry castings, brass foundry castings and forgings, and on the other to avoid the repetition that would be necessary if each were discussed quite separately.

The following is the actual sequence of the sub-sections :

Process Cost Allocation.

Standing Orders for Process Cost Allocation.

Metal Costs—Iron Foundry.

„ —Brass Foundry.

„ —Smithy.

General Costs—Iron Foundry.

„ —Brass Foundry.

„ —Smithy.

Product Records—Foundry (Iron and Brass).

„ —Smithy.

Rating of Process Products.

Process Account Surveys.

For those not familiar with the actual processes of the foundry and smithy it will tend to a reader grasp of the subject matter of these sub-sections if they are read first in respect to their application to the iron foundry, then read again in respect to the brass foundry, and finally as to the smithy. Italics have been introduced to help in this discrimination in the sub-sections that are not specifically confined to one process only.

The data requisite for properly rating process product necessarily influences the extent of dissection necessary in the cost allocation.

Taking the case of the *brass foundry*, an average price per lb. for each different alloy, is, in most cases, all that can be readily attempted, with, perhaps, a grading of the average price up or down to cover castings either more intricate or more simple than the

Purpose of
Process
Accounts.

Process Cost
Allocation.
F 129, 130, 131.
p. 612.
p. 616.

Process Cost Allocation.

average type. It is obvious that comparatively little dissection of costs is required where such a method is acceptable.

In the case of the *iron foundry* and *smithy*, on the other hand, the direct wages element in the total process cost is so important, and is so individual in character, having no sort of reference to the weight of product, that provision must be made for differentiating the application of these costs from those that have to be averaged. Then again, there are oncosts attaching to this direct labour per hour, as in the case of direct labour in other departments.

The producing units in the *iron foundry* will be moulding machines, with their relatively heavy upkeep, and moulders. Coremaking expenses are related to the time occupied in making the cores, though not, perhaps, with any marked regularity, but certainly with more consistency than a weight of casting basis would give.

In the *smithy* there may be presses and hammers which it is most necessary to treat as producing units and to apply suitable oncost rates for each hour in use.

There are, however, departmental costs in connection with casting and forging processes that are more consistently related to the weight of the product than to the direct labour involved in preparing cores or moulds or forming the forging. The heating, fettling, pickling, and annealing, general labouring and transport operations are the outstanding items of this character; though fettling does not occur in the case of forgings, pickling and annealing commonly does. Departmental sundries, especially in the foundry, follow the weight of product basis approximately.

p. 539.

Taking the departmental service expenses, as defined when dealing with the production oncosts, the only items of any consequence that are not directly related to the weight of product are overtime expenses, shop supervision and inspection. As to the latter item, inspection in these cases is as fairly allocated on a weight basis as on a direct labour basis. If all these items are dealt with on a weight basis, the influence on the product rate of the error incidental to applying overtime and supervision expenses also on these lines, instead of on a direct labour basis, will be negligible.

There is another element in process costs that has to be catered for in all three departments under consideration, namely, that of metals used.

In the case of the *foundries* there will be metal losses in smelting, pouring and fettling that may be considered with sufficient accuracy as a definite percentage of the weight of the product, and, therefore, can be included with those costs which are applied on a weight basis.

In the *smithy* the metal loss varies according to the type of forging, and can only be properly met by charging the gross weight of metal to the particular item of product. As it will be necessary to estimate the loss in many cases, there will probably be a certain proportion of metal loss to be treated with the general process costs and allocated according to weight of product. Process Cost Allocation.

The process accounts require therefore to have two main divisions, firstly as to metal cost, and secondly as to what are termed process general costs. The latter includes departmental service expenses, direct labour, and the departmental apportionment of production oncosts.

Fettling is direct labour, and effort should be made to record the time spent and allocation made accordingly to each job order, or alternatively, the cost of fettling can be included with the departmental service expenses for distribution on a weight basis, although a grading of the fettling charge per unit of weight on different classes of work would be fully justified, were it not for the accounting trouble involved. The same might be said of pouring, particularly as between large and small castings.

The cost of defective product can be added to departmental service expenses to be distributed by means of the process charge, including, if necessary, direct labour costs, where same are applied on the basis of weight of product.

Certain classes of castings are extremely liable to defect, *e.g.* cylinders which have to withstand pressure and slides which must machine to a perfectly clean face. Where these figure largely, the rates charged for the castings ought to recognise these facts, F 127. rather than that the cost should be spread over all the product equally.

There will be cases of new designs where many wasters may be produced before the process is properly adjusted. This might be an instance where the costs of the defective work should be charged to developments and experiments.

The main points that have been made above are tabulated and developed on the following pages in conjunction with a suitable series of standing orders for process cost allocation. Standing Orders for Process Cost Allocation.

Departmental process metal cost accounts and process general cost accounts may be kept in special process account books for each department, iron foundry, brass foundry, smithy. The accounts will show on the one side the total costs and on the other the total charges made for the product. Any differences disclosed after allowing for work-in-progress are dealt with at the end of the year F 163. through the works accounts annual abstract.

Standing
Orders for
Process Cost
Allocation.
p. 561.

		Standing Order No.		
		Iron Foundry.	Brass Foundry.	Smithy.
Process Metal Costs.	<p><i>Elements of Metal Charge.</i></p> <p>Metals - - - - -</p> <p>Refer pages 507-8-9. Ascertained Metal Losses are credited to this account and debited to the corresponding accounts G 4-2, H 4-2, K 4-2</p>	G 1-1	H 1-1	K 1-1
Process General Costs.	<p><i>Elements of Process Charge.</i></p> <p>Fuel - - - - -</p> <p>Departmental Sundries - - -</p> <p>Refer Standing Order S 6-2, page 488.</p> <p>Overtime Expenses - - -</p> <p>The remarks against Standing Order S 6-3 page 489 apply here equally.</p> <p>General Labour - - - - -</p> <p>This will include the cupola man, crane-man and general labouring.</p> <p>Departmental Staff - - -</p> <p>This will include foremen, inspectors (if any) and clerks—also production estimator so far as he is employed on department's work.</p> <p>Transportation - - - - -</p> <p>This may cover the cost of transporting the raw metal as well as the process product.</p> <p>Fettling, Pickling, and Annealing - - -</p> <p>This account will cover the wages cost of the operations named when not treated as direct labour as is recommended for fettling. The cost of power for pneumatic hammers and the like will probably only be conveniently apportioned when dealing with Production On-costs—Power Service—page 537.</p> <p>General Preparations - - -</p> <p>This order is provided to deal with cores, core irons, etc., made in advance and not for any particular order.</p> <p>Waiting Time - - - - -</p> <p>This allocation is provided to keep prominent any enforced idleness due to breakdowns, insufficiency of cranes, etc.</p> <p>Defective Product - - - - -</p> <p>The wages cost of wasters that have not been charged out as process product and have not left the Foundry or Smithy will be debited to this account. No metal charge will be made except possibly in the case of the Brass Foundry. Wasters discovered after being charged out as good product will be debited in full here, and the original order credited.</p> <p>There will be a certain scrap value in these wasters and if utilised in the Foundry the value should be credited to this account and debited to the process metal cost account. Brass Foundry wasters are more usually first passed into stock and in this event the scrap value is debited to the scrap stock account—U 2-1—see page 493. The cost of breaking up defective castings should be included here.</p>	<p>G 2-1</p> <p>G 2-2</p> <p>G 2-3</p> <p>G 2-4</p> <p>G 2-5</p> <p>G 2-6</p> <p>G 3-1</p> <p>G 3-2</p> <p>G 3-3</p> <p>G 4-1</p>	<p>H 2-1</p> <p>H 2-2</p> <p>H 2-3</p> <p>H 2-4</p> <p>H 2-5</p> <p>H 2-6</p> <p>H 3-1</p> <p>H 3-2</p> <p>H 3-3</p> <p>H 4-1</p>	<p>K 2-1</p> <p>K 2-2</p> <p>K 2-3</p> <p>K 2-4</p> <p>K 2-5</p> <p>K 2-6</p> <p>K 3-1</p> <p>—</p> <p>K 3-3</p> <p>K 4-1</p>

Standing Orders for Process Cost Allocation (Castings and Forgings.)		Standing Order No.			Standing Orders for Process Cost Allocation.
Process General Costs.		Iron Foundry.	Brass Foundry.	Smithy.	
	<i>Elements of Process Charge (cont.).</i>				
	Ascertained Metal Losses -	G 4-2	H 4-2	K 4-2	
	The items under this account will be transfers from the process metal cost accounts G 1-1, H 1-1, K 1-1, and will be based on the periodical investigations.				
	<i>Elements of Direct Labour Charge</i>				
	Direct Wages - - - -	G 5-1	H 5-1	K 5-1	
	This account records the direct wages, including extra pay, expended in the department.				
	In the case of the Iron Foundry and Smithy, the items of direct wages pertaining to the individual orders will be noted on the Foundry Daily Work Sheets (F 73) and the Smithy Daily Work Sheets (F 78), and the total of such entries should agree with this account. The individual orders will be debited with direct wages items and the process rate will therefore not have to cover this cost factor.				
	In the case of the Brass Foundry, the direct wages charges are merged in the Process Charge for rating purposes.				
	<i>Elements of Production Oncost Charge (on Direct Labour).</i>				
	Departmental apportionment of Works Expenses, as Production Oncosts - - - -	—	—	—	
	Building Service. Power Service. Producing Unit Service. Tool Service. Material Service. Administration Service. Contingency Service.				
	This apportionment is made in the Production Oncosts Book against the departments under consideration in common with all other departments, except as to Departmental Service Expenses which are already debited to the process account under other headings.				
	Oncost rates intended to cover these expenses are applied to the Foundry and Smithy direct labour as a stage in building up the total value of the product for each period, for inclusion on the Process Product Summary.				
	In the financial accounts, the proportion of production oncosts thus included in the process accounts must be duly transferred from the <i>Works Expenses Allocation Accounts</i> . For this purpose, the apportionment referred to is included on the Works Cost Allocation Abstract under the heading of Production Oncosts.				

F 118.

p. 569.

F 162.

**Metal Costs.
Iron Foundry.**

The metal costs for the iron foundry involve three main considerations, firstly, the issue of the various brands of pig iron from stock, secondly, the use of scrap produced within the foundry, and thirdly, the rate or price at which the mixture entering into the product is allocated, that is the rate adopted for the metal charge.

The stock of pig iron is not susceptible to the control of lock and key, and the question of correct records of pig issued is really subsidiary to that of the correctness of the mixture used in the cupola, and obviously the larger problem will include the less.

The question of foundry mixtures may not be the whole-art of founding, but it is at least the side where failure to keep watch will lead to failure of product or increased machining cost, such that no moulding or pouring skill can avert.

To specify a mixture to-day that will produce a desired result assumes conditions of uniformity in the brands specified and the scrap used which, to-morrow, may not hold good in one or other particular, with a consequently different result. Any day may, therefore, bring different instructions to the cupola man as to how he must make up his charges for a particular class of mixture; perhaps nominally known as mixtures A. B. C. D. etc., for particular purposes, so as not to clash with pig iron grade numbers.

It is desirable to emphasise the necessity for a foundry mixture
F74. card being issued on proper authority to instruct the cupola man as to the quantities of specified brands and scrap to be used for the mixture in question. Each instruction will stand until superseded by a later one under the same mixture reference.

While it is likely to be a profitable investment to have a chemist, with laboratory equipment, to issue these instructions and be responsible for the maintenance of chemical analysis, it is none the less desirable, when the foundry foreman is responsible, to adopt the practice of written instructions of this character. With the aid of the mechanical analysis originated by W. J. Keep of Detroit, Michigan, U.S.A., the foundry foreman can exercise a high degree of judgment, particularly if the management arrange for periodical chemical analyses to establish reference data.

A daily check of castings on these lines should establish such discipline in the cupola attendant's duties that accurate records of stock iron used will be available. The cupola attendant has only to chalk down the number of charges each day of each mixture and the foundry clerk can quickly convert the information into totals used
F75. of various brands and scrap. Incidentally stock control sheets for all pig iron can be kept up each day, thus avoiding unconsciously running low in the stock of particular brands. This risk is very real

with any considerable number of brands in use, and the best practice favours the use of many brands. Metal Costs.
Iron Foundry.

The second point to deal with is that relating to the scrap made within the iron foundry. Of the total iron melted each day a heavy proportion, sometimes 25 per cent. or even more, remains behind in the foundry in the form of runners, risers, etc., and this scrap is used in specified proportions in succeeding melts or blows. The differences between the weight of iron melted and castings produced is to an appreciable extent irrecoverable.

All the metal passing to the cupola having been allocated to the foundry metal account the scrap remaining in the foundry becomes floating scrap or work in progress which must not be debited unless previously credited.

Occasionally iron scrap is bought outside, and there will be in most works a certain weight of scrap castings returned from the machining and other departments weekly, if not daily. Obviously, the value of this external scrap must be debited to the foundry metal account ultimately, and if put into stock some confusion may arise between it and the floating scrap in the foundry. Instead of attempting to credit the foundry with the scrap made, which is a wasting quantity, and debiting the scrap used, the simpler course is to hold none in stock, in the account sense, and to allocate at once external scrap to the foundry metal account, increasing the floating scrap value accordingly.

On the stock control sheets the scrap stock receipts will be increased each day by the difference between the previous day's melt and the net weight of castings sent into stores, together with any item of external scrap. From this total the amount reported as used each day will be deducted. The scrap stock records will be kept in such grades as can be conveniently maintained. The balance of stock will require adjustment by reason of the irrecoverable metal loss occurring in the course of the foundry operations. To actually ascertain this loss involves taking stock of the scrap, and this can hardly be done frequently. As an alternative the scrap can be collected and the weight approximated with sufficient nearness to allow a safe figure of the ascertained loss to be stated. It is this figure that will form the basis of the adjustment necessary between the metal account (G 1-1) and ascertained metal losses account (G 4-2).

A record of the metal costs is kept in the iron foundry process F 134 p. 561. account book that will show the book value of the floating balance of metal in the foundry at the end of each account period. The relation of the book value to the true value will depend partly on the accuracy of the metal loss adjustment and partly on the rates

Metal Costs. used in connection with the metal charges for the castings made,
Iron Foundry. which is the third point to be dealt with here.

The rates used for the foundry mixtures must necessarily be in the nature of average prices based on the purchase price of the pig irons used and the proportionate value of the scrap metal used. It is, perhaps, hardly necessary to remark that scrap cast iron is in no sense an undesirable factor in foundry mixtures, but is an essential in the best mixtures within specified limits and of specified kinds.

As each consignment of pig iron is better stacked by itself on account of analysis questions that may arise, it is not difficult to indicate when a particular consignment is first broken on the foundry
 F 76. weekly report, which the foundry clerk should furnish each week to the works accounts office. This will be of use for checking the stock ledger accounts for the respective brands and will indicate the purchase price to be used.

Under the arrangement suggested for scrap metal, the rating or valuing of scrap will only be necessary for account purposes in arriving at the metal rate to be used for the different foundry mixtures during each account period. Current market prices of new metal may influence the scrap rate adopted, but it will be nearer to actual cost if the scrap rates are proportionate to the purchase prices of the brands of pig iron in use. Generally speaking, market prices apart from purchase prices should not disturb the rate used in cost accounts, except at the yearly valuation of stock when the rates used must not exceed the current market price.

It will be obvious that the metal rate can easily be fixed so as to show a profit or gain on the metal account, but the aim should be to adhere to the purchase costs as closely as possible, leaving profits to the sales accounts of the complete product into which the castings have entered. Not only so, but excessive metal rates inflate stock values unwarrantably and give a false picture generally.

Metal Costs.
Brass
Foundry.

The foregoing remarks relative to the iron foundry metal account apply to a large extent to the brass foundry metal account except, of course, as regards the cupola chargings. The metals for the brass foundry are advisedly kept under lock and key by the general stores and dealt out daily in the specified quantities as stated by the
 F 86. foundry foreman on goods issue vouchers. Sometimes the crucible charges are made ready in the stores. In any case, the margin of new metal in the charge of the shop should be small, be properly taken care of and duly accounted for.

The floating scrap will have a high value in proportion to its bulk, and considerable precautions are necessary to prevent unnecessary

waste or loss. It is desirable that the metal in the brass foundry should be ascertained daily to ascertain the loss. With adequate shop management, and its resulting control, a fortnightly stock-taking might be sufficient, provided only that the weighing up of scrap and unfinished castings is done with considerable care and no estimating allowed except for the dross on dirty scrap. It is desirable that a representative from the works account office should be present at the stocktaking to take the official record, but not as implying any reflection on the foreman. From this information the percentage of metal loss can be ascertained.

**Metal Costs.
Brass
Foundry.**

Swarf, or cuttings, when sent loose to the brass foundry is apt to upset the percentage of metal loss, unless the quantity sent in each period is fairly even. In that case, the conditions being equal, comparison between the percentages each fortnight will not be unfair to the foundry, and this plan can apply even when swarf is run down into ingots and sent back into stores. Loose swarf, however, will fetch higher prices in the market than ingot scrap, and care exercised in its collection, together with cleaning by magnetic separators, will be found very profitable. For one's own foundry use it is better to cast the swarf into ingots suitably marked.

In formulating the metal rates to be used for the brass foundry castings, it will be necessary to distinguish between those mixtures in which the use of scrap is permissible and those in which only new metal may be used.

The management will, presumably, give clear instructions to the foundry foreman as to mixture limits, and these should be known to the works accountant, if not to his staff. The metal rates should be computed in accordance with these instructions.

F74.

In the smithy the question of metal costs is not influenced by scrap in the way that occurs in the foundry. Scrap is produced in the operations of forging and stamping, but is not usually rehabilitated in the ordinary smithy. In the larger smithies the heavier scrap may be reformed into billets, and for the present purpose it may be assumed that such billets would be made for stock and issued as billets for forging purposes later.

**Metal Costs.
Smithy.**

There will be metal losses by scaling and in small chips that can hardly be considered as scrap. The scrap that is saleable may realise very good prices, but it will be convenient, and not seriously unjust, to consider this scrap as a metal loss from the point of view of the metal account. The amount realised by any such sales can be credited to the standing order for metal loss (K 4-2).

It will be appreciated that metal losses have little relation to the weight of the forging produced, so that the metal loss cannot quite

**Metal Costs.
Smithy.**

equitably be dealt with by the average percentage addition to the net weight of each forging. On the other hand, the errors of such a method may be considered too insignificant under some conditions to outweigh the advantage of its simplicity. The best compromise is for the smithy foreman to estimate the metal loss in each instance; at the worst, by percentage formulas proved by careful test to be appropriate for each type of forging.

Assuming the metal loss to have been estimated with accuracy (presumably by deducting the net weight of forging from the gross weight of the bar with due allowance for useful surplus) it will be necessary to know what size and kind of bar has been used and whether hammered or rolled, to arrive at the proper metal charge.

Where bars or billets are bought specially for any order it is certainly necessary to allocate the cost of same to that order, and this may be achieved by making the metal rate for the forgings in question to correspond, always supposing that the smithy metal account is charged with the bar or billet in the first instance. There may also be questions of quantity used, the margin allowed perhaps proving excessive, although the sizes of billet or bar to produce a given forging are usually estimated very closely by an experienced foreman.

Taking all circumstances together, it is desirable to have the fore-
F 79. man indicate on the forging delivery sheets in sufficient detail the quantity, size, and kind of metal to be charged to each batch of forgings. To offset this trouble, and to facilitate the working of the shop, he may be allowed to hold a certain margin of stock and to
F 79. account for same in this way without further vouchers being necessary. This obviates the need of booking returns of useful surplus as only the actual metal used, including wastage, will be reported. Following from this all metal issued to the smithy will be charged to the metals account (K 1-1) in the first instance, and then allocated to the orders concerned through the forging delivery sheets.

One advantage of this plan is that every forging will carry its metal charge, wherever the metal has come from. Odd pieces of useful surplus metal that are used up will be charged automatically, whether returned into stock or not.

The foreman's estimates of metal used are not likely to be infallible, and the stock of metal in the smithy (presumably kept in some order) will need to be taken at least several times a year to verify the position of the metal account, which is kept in the smithy
p. 561. process account book. Heavy lumps can have their weight painted on and bars can be measured readily, more particularly if the size is
F 134. also painted on. For working out the corresponding weight the

help of an estimator or draughtsman practised in the use of the slide rule, may be requisitioned. As the actual sizes of the bars will vary slightly from the nominal size, and calculation of weight can only be approximate, the stock at the end of the year needs to be actually weighed.

Metal Costs.
Smithy.

The wholesale or main stock of bars suitable for smithy use may advantageously be controlled by the general stores. The general stores stock control cards would record the bars issued to the smithy as being provisionally accounted for, and when requisitioning further purchases the storekeeper might ignore the margin actually available in the smithy.

F 89.

Turning again to the iron foundry, some further consideration is necessary of some of the items falling under the heading of process general costs as tabulated in the specimen standing orders for the process accounts.

General Costs.
Iron Foundry.

Fuel (G 2-1) and Departmental Sundries (G 2-2) involve special arrangements for reporting the consumption in each account period. With regard to the less bulky supplies, the main stock may be kept at the general stores and dealt out either at stated periods or in stated quantities. The last-named course is likely to be the more economical. Provided the quantities given out do not exceed say a week's supply, the issues may be unhesitatingly charged out at once, as the figures for each period will not then be thrown out of balance to any appreciable extent.

The foundry clerk can retail these supplies with a minimum of entries. Squared sheets for each kind of supplies, with a square allotted to each man, can have the individual issues noted thereon to inculcate a regard for carefulness and to satisfy the management as to what becomes of the items of more intrinsic worth, such as brushes, mallets, etc., but discretion must be used. These records, as far as they relate to utensils and implements, may be consulted when a foundry worker leaves, and the foundry clerk may possibly be empowered to sign his tool clearance ticket.

F 21.

Fuel and supplies of a bulky or loose character, such as limestone, sand, blacking, flour, etc., can hardly be kept within the general stores and issued in small lots as suggested above. Consequently, for these items the foundry clerk will have to make up a weekly report of the estimated consumption—using the cupola charge records for limestone and coke consumption. These reports will be sent to the general stores for stock control purposes and thence to the works accounts office.

F 76.

The costs allocated to defective product (standing order G 4-1) will be derived from the viewing reports relating to castings that

F 98.

General Costs. are rejected for foundry faults. These costs will be transfers from the order to which the rejected casting was originally charged.

Iron Foundry. In the case of castings rejected before leaving the foundry

F 72. foundry waster tickets should be used. This standing order should be debited at the ordinary process charge only, the metal remaining in the foundry scrap. There will be a difference between the standard mixture rate per cwt. and the scrap rate per cwt., but it is hardly necessary to consider in this connection the metal deterioration in a faulty iron casting.

It is a very important principle that all castings should be carefully inspected before being sent into stores.

The items entering into the iron foundry process account are tabulated on pages 504-5.

General Costs. In the case of the brass foundry general costs, the remarks made above as to the iron foundry apply in principle, and little more need be said. In view of direct labour in the brass foundry being usually averaged on the basis of weight, emphasis is laid on the necessity of grading the rates used in respect to the general costs. In this case the process charge will have to cover not merely departmental service expenses, as in the iron foundry, but direct labour and production oncosts on same as well.

p. 501. The metal rate will be computed for each mixture as already mentioned, and a graded process rate applied. Suitable grades will be *intricate, ordinary and plain*, rather than heavy, medium and light, for a heavy casting may be intricate and costly in workmanship per unit of weight, and a light casting may be plain and cheap in workmanship per unit of weight. This question of grading requires the exercise of judgment, and the routine will be simpler and the practice much more consistent if distinguishing grade

p. 516. F 66. marks are put on the pattern by the foreman patternmaker. To arrive at the proper process rate for the respective grade, it is better to define the grades as definite percentages above or below the mean or normal rate.

F 72. In the matter of brass foundry wasters that do not leave the foundry, the metal deterioration is too marked to be ignored, and consequently a metal charge should be made representing the depreciation in value. The point may, however, be waived in regard to wasters of small weight, to save the trouble of applying metal charges of such small amounts. The product rate used for debiting the waster to the defective product standing order (H 4-1) should be the same as would have been used if the casting had proved sound, and adjustment then made as to value of scrap involved.

In the case of defective castings discovered after being charged out in the ordinary way, the casting itself should be sent to the general stores and its value as scrap transferred from the original order to the scrap stock account (standing order U 2-1), through which medium it is debited to the stock account concerned. The balance of the defective product original value will be credited to the original order and debited to the defective product account (standing order H 4-1).

**General Costs.
Brass
Foundry.**

The items entering into the brass foundry process account are tabulated on pages 504-5.

The comments made relative to the iron foundry general costs also apply in principle to the smithy general costs.

**General Costs.
Smithy.**

Defective product is not likely to figure to much extent in the smithy accounts, and any correction found necessary by the smithy foreman, after checking over the forgings before sending same into stores, is usually better done under the original order than dealt with as an expense under defective product standing order K 4-1.

Defective material is usually the main cause of defective forgings, and two courses are open in that case. The one is to transfer the whole product charge from the "net production cost" section of the order concerned to the "errors and defects" section of the same order. This gives the smithy account the benefit of the product, although defective. The alternative course is, to relieve the net production costs of the order concerned at the expense of the smithy account, as being defective product. The latter is, perhaps, the better plan in stimulating the smithy foreman to watch for faulty material.

The items entering into the smithy process account are tabulated on pages 504-5.

The method of recording foundry output is most conveniently based on the delivery ticket accompanying the castings to the stores.

**Product
Records.
Foundry.**

If only for the sake of checking weights it is desirable to have separate delivery tickets for each consignment, and this check can only be exercised with any regularity when all castings are received by a suitable stores instead of being delivered direct to the machine shop.

The proper regulation of work in progress alone requires that castings should not be dumped in the machine shop except to a programme, and then only if the batch of castings required is complete, or if castings are large and heavy, in which case cost of transport would dictate as little handling as possible. A certain elasticity

Product
Records.
Foundry.
p. 146.

is integral in the suggestions previously made for regulating work in progress by adapting the machining orders to the number of castings available, if it is not feasible to wait for a full batch.

The point is made that a work depot is the most suitable centre for distributing castings, and simplifies the clerical routine considerably compared with using the general stores, although it is better to have the casting first deposited at the general stores, to be drawn out by the work depot as required—the work depot being advised of the castings being available by a goods issue voucher.

F 86 This routine goes to ensure accurate allocation of castings, a point not so easily achieved when castings can be applied to more than one order, or will make more than one design of component.

With the delivery tickets serially numbered, the works accounts office can check that all of them are received.

The question of foundry wasters involves a different routine.

The natural tendency of every foundry foreman is not to disclose how many wasters occur within the foundry, and it is, perhaps, expecting rather much of human nature to rely on his volunteering the information. Apart from that, the routine, as set out below, necessary to get this information furnishes a record of considerable value in maintaining foundry efficiency.

Each day the foundry clerk is required to furnish a report of all the castings moulded that day, the report giving the moulder's check number, order number, pattern mark, and number of moulds made, together with the time taken, for allocating the moulder's wages. Production oncosts are applied on these foundry daily reports. If the casting in any mould is not made that day the item is marked as not cast. This report has to be sent to the general stores each evening, and then as the delivery tickets come through the next day for the fettled castings sent into stores, the items are checked and enquiry made as to any divergence, after which it can be passed to the works accounts office for charging up.

F 72. The foundry clerk will issue foundry waster tickets for each waster, duly certified by the foundry foreman with the check no. of moulder responsible, and this will be the basis from which the works account office will make the necessary entries in the accounts.

The foregoing scheme can be applied in full to both foundries, but there will not be the same success in the matter of intercepting brass foundry wasters owing to the conditions of casting and fettling, while the clerical work involved will be rather excessive with the usual run of brass foundry work. Probably a compromise suited to the local conditions can be arrived at without giving way wholly as regards this method of control.

In the case of the smithy, the argument advanced as to distributing the product from the work depot also holds good. Product
Records.
Smithy.

A further point also arises over the notification to the works accounts office of the kind, size, and quantity of metal used. There is little doubt that this information should be given on the forging delivery sheet to ensure that the investigation as to metal waste F 77. is done before the product leaves the smithy, to obviate delays in F 78. accounting that would occur if this work were deferred. Delays in sending the product forward should not, however, be excused on these grounds.

The actual rating or pricing of process products involves the collation of the various elements of the costs pertaining to each item of product. This inclusive rate may be designated the process product rate or more briefly, casting rate, forging rate. It may be expressed per unit of weight or quantity. Rating of
Process
Products.

The sources of the requisite information will be the respective delivery sheets and daily work sheets already mentioned.

From the delivery sheet can be derived the metal and process charges, and from the daily work sheets, the direct labour and oncost charges.

To obtain the process product rate for any individual item, the direct wages costs for each batch or job order require to be abstracted on a rough component rate card from the respective delivery F 127. and daily work sheets. Average figures should be taken, if possible, of several batches, and particular attention given to the allowance for defective work, notably in castings.

The daily totals of all metal, process, direct labour, and oncost charges, are summarised in the process product summary book. F 118. From the process product summary a works product abstract F 161. is prepared in the works accounts office for the financial department, and at the same time entry is made of the value of output in the respective process account books kept in the works accounts office.

The respective *process accounts* in the financial books (manufacturing ledger) are duly credited with the total value of the output and the *works materials suspense account* debited with the same total, as materials to be accounted for. This involves a duplication of accounts but the work involved is infinitesimal, and allows the cost accounts to be comprehensive and independent of the financial accounts—an appreciable advantage in the works accounts office routine.

The cost allocation of the various charges will be either made to F 129. the respective production orders as "process product charged direct,"

p. 561.

F 134.

p. 571.

**Rating of
Process
Products.**

or to general stock account or component stock account, as may be appropriate.

In the latter event the casting or forging rate for the individual rough components will have to be settled for the issue of same later from stock for machining.

**Process
Account
Surveys**

The process account figures and statistics necessary for accounting purposes should be rendered into suitable form for administrative or management purposes, and it will be convenient to designate such a summary as a survey.

The necessity for process account surveys will be apparent for testing the efficiency of the departments concerned, particularly if normal standard rates are used for process charges and oncost charges. The difference disclosed in the process account as a whole will then be some index of the comparative efficiency of the department.

The lines laid down for arriving with some accuracy at the true cost of the individual castings and forgings should furnish figures from which to settle profitable selling prices, if the product should be sold unmachined.

Where a considerable trade is done in unmachined castings and forgings, it will be probably necessary to fix selling prices in grades rather than for each kind of casting. This in no sense discounts the value of individual costs, for these will indicate in what respect the selling prices are insufficient, and conversely, what lines of product give the maximum profit. Under such circumstances it may be worth while dissecting the costs of defective product according to the grades in the selling prices.

Average costs of process product per unit of weight will be of value only where the character and volume of work done is consistently regular.

In the case of the *brass foundry*, the use of such average costs is usually about the only convenient course to take, and the arguments against it are discounted to a large extent by the relatively small proportion that the direct wages bear to the value of the product. It is, of course, in regard to direct wages and oncost charges on same, that average costs are so likely to be wide of the mark in any given instance.

Assuming for illustration that in a given case the metal charge per lb. is 1s. 3d. and the process general costs average 5d. per lb. On these figures the average product charge for the particular grade of metal will amount to 1s. 8d. per lb. If the true process general costs in a particular case are demonstrated to be 7d. per lb., by reason of exceptionally high direct wages costs, then that part of the cost will be 40 per cent. above the average. The product

charge will, however, only have to be increased by 2d., to 1s. 10d. per lb., which is only 10 per cent. in excess of the normal rate. With the effect of fluctuating process general costs minimised in this way merely by the high value of the metal, the use of graded charges or rates, as previously suggested, will leave little ground to dispute the brass foundry product charges as reasonably accurate.

Process
Account
Surveys.

p. 512.

The accounts provided in the respective process account books as to metal costs and process general costs for each department concerned, will furnish, in conjunction with the weight of output, the necessary figures for arriving at average metal cost and average process general costs per unit of weight. These figures will probably only be of limited use in the case of the iron foundry and smithy, but they will be some guide to the management in making comparisons, particularly with past records that have not been carried beyond that point.

p. 561.

An important step prior to using the metal cost figures for averaging purposes is to learn the value of the work in progress as regards metal.

With regard to process general costs of work-in-progress, in the *iron foundry* and *smithy* the practice of allocating the direct labour and oncost charges on same, independently of the metal and process charges, will allow that portion of the work-in-progress values to be obtained without taking stock.

The process charges pertaining to work-in-progress, being based on the weight of metal in the product, can only be estimated from the weight of unfinished product.

As the process charges only apply in full to the product as delivered to the stores, it is simpler and of trifling consequence if process charges are ignored in valuing the work-in-progress.

This means that for the *iron foundry* and *smithy* the figures of the process general costs need adjustment only in respect to the items of direct labour and oncost charges for product not yet delivered into stores.

It is perhaps hardly necessary to attempt any definite proposals as to the form of the process account surveys. The nature of the business and the views of the management will operate to give a special character to the survey in each instance.

A considerable volume of useful data can be derived from the accounts when in the form here discussed.

In the case of the *iron foundry*, statistics as to the ratio of the weight of iron melted to the weight of castings sent into stores can be obtained from the foundry stock control sheets on the one hand, F 75. and the delivery sheets on the other. The use of lbs. on delivery F 71.

Process
Account
Surveys.
p. 447.

tickets facilitates addition of totals and allows the use of the same mechanical means as used for totalling money values.

Other useful items on the survey may be :

Percentage Ratio of weight of wasters to weight of product sent to stores.

Percentage Ratio of fuel weight to product weight.

Average fuel cost per unit of product weight.

Percentage of metal loss on basis of metal costs.

" " " " product weight.

Average metal cost of product per unit of weight.

Average process general cost of " "

Average total cost of " "

Average direct wages cost of " "

Average number of product items per ton of product.

p. 561. Percentage of difference (surplus or deficit) on Process Summary Account.

VI E

STOCK PRODUCTION ACCOUNTS

FINISHED PRODUCT

FOLLOWING the consideration of process product, which has reference more particularly to intermediate processes, notably the production of castings and forgings, it is appropriate to discuss the cost of manufacturing finished product for stock.

Purpose of
Stock
Production
Accounts.

To aggregate the results of manufacturing for stock, it is necessary to have a *stock production account* in the financial books, although this must not be confused with the manufacturing account, often kept, covering the entire works production, whether for stock or sales orders. Such a manufacturing account is substantially a works profit and loss account.

p. 569.

In the present case the stock production account is considered as a cost account dealing with the production of all finished work or product in a condition for sale, that is passed into stock prior to sale. Stock product may, of course, be often sold before it is completed, but in principle it is all made for stock in the first instance. If rough castings, for example, were the saleable product of a factory, the production of castings for stock could occasion a stock production account, although with a process account in operation, this further stage is unnecessary so long as there is a sub-order for each batch of stock castings under which their individual value or stock rate can be determined.

F 127.

It is desirable to incorporate in the cost ledger under the respective stock production order reference a memorandum of the value of deliveries, as accepted into stock. The differences between the stock value of the total output and the total costs, whether of over-charge or under-charge, require to be posted to a stock production differences account in the production oncosts book.

F 132. p. 562.

The values of daily deliveries of finished product passed into stock are summarised in the finished stock product summary book, and from this source a periodical works product abstract is prepared.

F 108. p. 571.

F 119.

F 161.

**Purpose of
Stock
Production
Accounts.**

giving total values for crediting the "financial" stock production account, and this account will be debited with the costs of stock production orders taken together; these cost figures will be derived

F 162. from the periodical works cost allocation abstract furnished by the works accounts office.

F 142. In both sets of records the value of work-in-progress at the beginning and end of the financial year or half year is duly brought into account.

The works value or rate adopted for the product made under any given stock production order may not exhaust the costs by reason of the balance of costs remaining in respect to drawings, patterns, jigs, special tools or gauges, or, under subsequent repetition orders, the product may be charged out in excess of the costs by the amount of the percentage additions to direct costs made to cover drawings, etc. Independently of these factors, there may be fluctuations in the costs on successive batches, though with continuous production the costs should steadily decrease, if due consideration is given to the possibilities of increasing operation efficiencies, and if the methods of remunerating the workers encourage the development of individual efficiency.

F 128 It is practically impossible that the individual rates used for valuing the product will exactly balance the costs and some difference is bound to occur on the account as a whole, either of over-charge or under-charge. Whatever net difference is disclosed

F 164. must be included as either profit or loss in the works profit and loss account.

A memorandum account in the works accounts office, suitably aggregating the cost ledger, records for each stock production order will facilitate criticism of whether the stock rates adopted are working out satisfactorily against the total costs for any one stock production order, or on the average of a group of such orders for a common class of product.

**Stock
Production
Sanctions.
p. 9.
p. 310.
p. 316.**

The first stage in the discussion of finished stock product is to consider the conditions that should regulate the scope of the orders by which the manufacture is authorised.

To an extent the conditions will be the reflex of trade activities, but this has perhaps more influence on the quantity of stock than its character, and quantities do not necessarily affect the routine pertaining to stock production orders. It may, however, be accepted as a starting point that the quantities for these orders cannot with safety be derived from any hard and fast rules as to maximum and minimum stock.

In the matter of spare parts for customers' repairs and replace-

ments, the character of past business will largely determine the quantity of reserve stock that is to be held by the works.

**Stock
Production
Sanctions.**

These reserve stock quantities should be carefully settled by conference of the works manager and chief designer, and then all rated and extended for approval by the managing director as to the total values involved.

In a sense quantities authorised to be held as reserve stock may be considered as the maximum stock limits, but this will probably only be true for those items that are not being used in current designs, and, therefore, for which no further authorisation of stock is likely to be made.

In conjunction with the reserve limit, there should be an ordering limit fixed to facilitate stock control, but the point is one to be settled by works conditions. When the shops are slack, reserve stock and requirements may often be anticipated, without waiting for the ordering limit to be reached, and, similarly, when the shops are congested, production orders will need to be issued considerably in advance of what would be necessary under normal conditions, so as to give the better chance of getting the work done in time to avoid a shortage of stock.

As to the manufacture of stock product for future sales, as distinct from the reserve stock intended primarily for repairs and replacements, this raises issues that can only be determined in the light of selling policy, and the trade outlook. The matter is one of such importance that the sanctions for putting in hand stock product should be derived from the directorate. The form of the sanction may very well leave some discretion with the general works manager as to the most economical method of carrying out the intention of the sanction. The lines upon which the sanction will be drafted will presumably be to make a certain quantity of certain standard types of complete product (machines, engines, etc.). It may be that some parts or components will be common to several types, or it may be that there is a standard nucleus type which can be adopted to meet sales requirements by varying certain details, in themselves standard, and yet making when complete a particular variation from the standard type.

Another factor is the minimum quantity of certain components that may be made with reasonable economy. This quantity may easily exceed the number necessary for the complete products authorised. It is, however, quite possible to give too much weight to this consideration and to accumulate surplus stock that will destroy any initial economy in the cost of production per piece, and may have been, indirectly, very costly in having held up the saleable output of the factory needlessly. On a given item these

**Stock
Production
Sanctions.**

considerations may not amount to much, but taken in the bulk the pursuit of manufacturing efficiency on these lines may prove misleading, if only that the existence of surplus stock will not control market conditions, even if it steadies the drawing office in making amendments in designs.

The many conditions that enter into the question of stock production orders make it imperative that the orders shall be built up very carefully as to quantities of the various details required.

p. 154.

It may be the function of the works office, through its production regulation section, to interpret each sanction in terms of the definite or minimum quantities required of each component. The question of putting in hand additional quantities as a reserve to provide against defective material or work is particularly one to be dealt with by the works office, in conjunction with the stock control records of reserves already provided and the probabilities of each case.

Each new line of product will necessitate extensions to the range of authorised reserve stock.

p. 10.

It may be found better for all castings and forgings ordered on behalf of reserve stock to be put into stock, in the first instance, as rough parts, and for the machining to be undertaken only in accordance with the programme laid down in outline by the works office and worked out in the work depot. One advantage in such a course is, that the works depot chargehand may possibly have authority delegated to him to initiate requisitions for rough components for reserve stock, without having to obtain individual sanction from the works manager, and if these rough components are put into stock (presumably in the general stores, certainly not in the work depot) further action can be dependent on specific authority to be obtained in each case from the works office, acting directly under the works manager's instructions. A daily sheet of proposed machining orders for reserve stock may be the best medium for obtaining the requisite authority.

**Provision of
Jigs, Special
Tools and
Gauges.
p. 467.**

The difficulty that faces the works manager frequently, in connection with new lines of stock product, is how far to go in the matter of jigs, special tools and gauges. His path may not be made easier by the accounting practice advocated of associating all costs of jigs, special tools and gauges with the costs of the order for manufacturing the product. The costs are, of course, kept in separate sections, but they are there and will not be hidden. It is easy to say that the works manager should have the courage of his convictions and make all the equipment necessary for turning out the complete product at the minimum cost, but much discretion is called for.

The question of how much to spend on new jigs, special tools and gauges is mainly dependent on the selling policy for the particular line of product under consideration, and no very useful remarks can be made here, except that the whole initial cost should be weighed up beforehand and that the works manager should derive the necessary guidance from a conference with the managing director, sales manager and chief designer followed by detailed consideration with a tool committee as indicated on page 23.

Provision of
Jigs, Special
Tools and
Gauges.

p. 139.

The method offered for ordering jigs, special tools and gauges is dealt with on page 141.

When stock product has been manufactured, the problem arises as to the stock rate or works value to be placed upon it.

Rating of
Finished
Stock
Product

So far as the net production costs are concerned, the total costs divided by the quantity produced may be said to give the proper rate per unit of product. This, however, ignores the costs of errors and defects, as also of drawings, patterns, jigs, special tools and gauges.

p. 465.

Even the net production costs may be abnormal for the first batch of a new line of product, and, if that fact is clearly established, it is equitable to transfer a portion of such costs to developments and experimental expenses account, to be borne as a general charge on the works profit and loss account while under certain circumstances some part of the extra cost may be temporarily capitalised, that is carried forward as an asset to be written off in a later year. The cost of errors and defects on the first batch may sometimes come within the same category.

p. 472.
p. 572.

Drawings and patterns for stock product are not susceptible to obsolescence or entire supersession, by reason of modification of design, to the same degree as jigs, special tools and gauges. It may therefore be in order to consider that a larger portion of the costs of drawings and patterns than of jigs, etc., can be legitimately capitalised to the relief of the stock production account. It is, however, very desirable to treat as little as possible of such costs as capital expenditure.

The costs in these two connections that are not capitalised or treated as a general charge against works profit and loss, may be deemed to constitute part of the works costs of the product, and the only query is, over what quantity of finished product the costs shall be distributed.

After the approved adjustments of the net production costs have been made on the ground of development expenditure, the average cost of each unit of product, in the first batch, may have a definite percentage added to cover its estimated proportion of the costs of

**Rating of
Finished
Stock
Products.**

errors and defects, and of drawings, patterns, jigs and special tools. This will, as a total, constitute the rate of the product in question. The costs of succeeding batches may be expected to modify the original rate of the product, and in due course a virtually standard price may be admissible for stock account purposes that will ignore small fluctuations in costs.

The foregoing remarks rather assume that each stock production order covers the manufacture of the exact quantity of components required for a definite number of units of complete products, together with the work of assembling, erecting, and testing same, and, of course, all incidental standard fittings (bolts, nuts, etc.).

When standard assembly units are the rule, separate stock production orders may be issued for each variety of unit, and a further order for their erection as complete products.

In practice, these conditions will be quite frequently subject to some amendment, but not necessarily sufficient to destroy the value of an average of the resulting total costs, for rating the unit of product. When, for an intended batch of complete product units, it is necessary to put through alternative components to meet possible variations in sales, it may be admissible still to use the average costs as the rate for the complete product by assuming the variable elements as a common charge.

A more accurate method will be to manufacture under the original stock order only the components for the nucleus standard type, and to issue separate orders for the variable components, which would have to be put in stock as finished components and drawn as materials for completing the erection of the product in readiness for sale. Separate erection orders for each combination would, of course, be necessary for obtaining accuracy in the average costs of each combination.

An alternative that allows for any combination of components is to issue separate production orders for each component, and to put the finished components into stock to be drawn as required for assembling. An objection to this course is the difficulty of regulating the output of complete assembled product, when there are so many orders to be controlled, without the aid of a common reference to those orders, linking them up with the complete product in question.

p. 151.

A compromise has been recommended elsewhere by which machine orders are issued for batches of components and assembling orders for standard assembly units or other convenient sections of the complete product. Further, erection orders are issued for erecting the several assembly units necessary to form a complete product. Under these circumstances, the original stock

production order may be for complete products—the sub-orders serving to sectionise the costs as well as regulate the production—and the scheme laid down for associating the costs of drawings, patterns, jigs, special tools and gauges and of errors and defects with the main order can be carried out quite simply.

In building up the rate of individual components, the use of a flat percentage addition to the net production costs, in respect to drawings, etc., is not quite as satisfactory as in the case of the complete product. Some components may entail no expenditure for patterns, and others none for jigs, special tools and gauges, while in some instances the expenditure on this account may be very high proportionately. It may be expedient in rating unassembled components, for stock and cost allocation purposes, to ignore the incidence of this expenditure which, in that event, would have to be treated as a general charge on works profit and loss, but the facts of each case ought unquestionably to be adequately provided for in the fixing of selling prices of spare parts. Other costs, such as case-hardening, may have to be considered in much the same general way, as circumstances may dictate.

Component rates may be fixed with more reliability if all the operations are scheduled, and the average cost of each operation filled in with the appropriate production oncosts for the particular machines used. The performance records kept by the production estimator may, and probably ought to, serve this purpose better than the cost accounts.

However the rates of stock product are arrived at, care must be taken that they never exceed the realisable price, viz., the net selling price, less the appropriate commercial oncosts. There should never be any thought of using cost figures for stock valuation that exceed this amount. The loss on any line of product should be kept in evidence until the costs of production are made to fall within the limit that will allow a profit to be made on that particular line.

A reference is necessary to the accounting problem incidental to mass or continuous production of one line of product, such as rifles, typewriters, locks.

Mass
Production
Accounts.

p. 6.

Separate cost allocation accounts for each batch may easily involve too much clerical work. For this reason the cost figures necessary for rating the product and correcting the rates to date can be more economically and satisfactorily derived from special investigations from time to time.

Under these circumstances, the costs can be aggregated for the different components under suitable references, virtually standing

**Mass
Production
Accounts**

order numbers, and the output value of the components duly credited to the respective accounts. This maintains the general scheme of cost accounts without undue or relatively valueless sub-division.

In some cases the plan is adopted of specially marking particular stock production orders for which the component costs are to be taken out. This may tend to an unduly favourable showing, but should obviate special investigations after the event, which are likely to involve a great deal of time when carried out thoroughly.

**Conversion
of Stock
Product.**

It will occasionally happen that stock product requires to be converted or altered in some respect to obviate it becoming obsolete.

The simplest course is to issue a stock production order for the conversion, and to allocate the value of the product in question as it appears in the stock accounts, to the conversion order, and then to deal with the converted product on the lines already laid down for the original product. Care must be taken to fix a proper rate for the converted product which may, or may not, be the same as that of the original product. The loss incidental to these conversions will necessarily go to swell the cost of manufacture without the works having been responsible for it being incurred, but the alternative would be an ultimate heavier loss in stock values, which would be bound to fall on the works profit and loss account.

**Suspended
Stock
Production
Orders.**

When stock production orders have to be interrupted for more urgent work, or where, for lack of efficient production control, such orders are used to mark time on, costs will be high and the product may take an excessive time to get finished. The system of production control can be devised to ensure that all work on a particular item is suspended when the demand for it collapses.

Whenever circumstances unduly prolong the completion of stock production orders, it will be often found advisable to call the material in and to close the order. It will be admissible, if the material will be useful ultimately, to charge the material value back into the stock account of reserve rough components. Any wages expenditure had best be transferred to the stock production differences account at once, as a loss or undercharge on the orders in question. Should circumstances require the rough components to be drawn from stores and completed later on, the labour previously expended will be recovered in the rate placed on the finished product, and this will mean a corresponding gain to the stock production differences account.

This line of action may seem drastic in its first stage, but it clears the shop floor, and clears the accounts. If, on the material being drawn out for completion, the original wages expenditure is not readily traceable, a careful estimate of the work's value of the finished product will be quite admissible under the circumstances.

**Suspended
Stock
Production
Orders.**

P. 151.

In certain cases the material on suspended stock orders may be temporarily retired to the work depot, but this, by itself, does not clear the accounts, and probably only postpones the more drastic action.

VI F ONCOSTS

Definition of Oncosts. ONCOSTS as a term covers all expenditure—apart from capital expenditure—pertaining to a manufacturing business, that does not enter directly into the product or that cannot be directly allocated to specific items of product.

The elements of oncost expenditure may for convenience be described as *expenses*.

The production expenditure that does enter directly into the product is known as direct labour and direct material.

There are certain items of wages expenditure that directly bear on the product if they do not exactly enter into it, such as supervision, viewing and personal assistance. These can be defined as secondary labour and they can be allocated to specific items of product with close accuracy although not with the same precision as direct labour.

There can also be secondary material ; for example, oil used for an engine test, but there is less occasion for recognising secondary material than secondary labour.

Direct and secondary labour and material together constitute *prime cost* as it should be and is very generally understood.

Oncosts, in other words, are the balance of costs over and above prime cost and are synonymous with indirect costs, overhead, shop, or establishment charges. In the United States of America oncosts are commonly known as “expense burden,” a quite excellent term but no better than our own, and probably older one, of oncosts.

Oncosts are separable into two divisions :

Production Oncosts.

Commercial Oncosts.

Production oncosts have reference to works expenses, that is, those expenses pertaining to production up to and including the despatch of the product from the works. It is as if the works were an inde-

pendent self-sufficient organisation passing on its product *en bloc* to be disposed of by the commercial side of the business, acting as merchants. It is, of course, by no means uncommon for the disposal of product to be dealt with by a separate company altogether. Expenses beyond work expenses are conveniently considered as commercial oncosts. Consideration is given further on to the expenses that may seem to be on the border line.

Definition of
Oncosts.
p. 441.

The method widely adopted of applying production and commercial oncosts in one combined flat percentage is misleading in ninety-nine cases out of a hundred.

The division between production and commercial oncosts is of special importance for two reasons, firstly that the cost accounting system should furnish the total cost of producing every article made and to do this the production oncosts must be segregated. Further, only by this separate treatment can any approach be made to an intelligent application of the production oncosts.

Interest on capital is commonly not acknowledged as an item of production oncosts, but as a matter of logical treatment, the hire of capital, being essential to production, should be recognised accordingly as a factor in costs of production. The payment of that hire cannot be evaded in the case of rent and debenture charges but there is no morality in treating interest on other capital as an optional expense because dependent on profits. There is no real profit until that interest is paid. This contention has been recognised by the Federation of Master Printers in their standardised costing system.

p. 554.

In some firms' accounts, depreciation, even, is treated as an optional charge on profits instead of as a production expense. This is an evasion of the hard facts, as if the efficient life of the plant depended on the prosperity of the concern. The object, of course, is to be able to defer obligations in the lean years with the hope of making up in the better years. The method is tolerated by some professional accountants probably because of the imperceptible character of depreciation—a failure perhaps to recognise it as a physical process of decay and lessening value. The argument that depreciation is only a matter of financial provision against the day of obsolescence is apt to encourage dangerous optimism and self-deception. The clearer course is to admit depreciation on a proper scale as an inevitable factor in manufacturing costs.

p. 415.

It will be helpful to consider production oncosts as the total works expenses applying to any given product, process or department. An alternative name for production oncosts is "shop charges" as used in the earlier editions of this book.

It is necessary, as is shown later, to apply production oncosts

Definition of Oncosts.

departmentally, if not according to the individual producing units concerned, hence production oncosts become in practice not general production oncosts but departmental production oncosts, so that the alternative term previously used of "shop charges," *i.e.* workshop charges, is quite appropriate and not without some merit of brevity. It is thought, however, that adherence to the expression oncosts, will help in following a fairly complex question.

Commercial Oncosts.
p. 36.
p. 441.
p. 566.

The following are representative items of commercial expenses requiring to be applied as commercial oncosts :

- General Offices—Rents, Rates, Taxes, Insurance.
- „ „ Heating, Lighting and Cleaning.
- „ „ Depreciation of Buildings, Furniture, and Fittings.
- „ „ Office Equipment Repairs.

Office Salaries.

Commercial Stationery and supplies.

Stamps, Telegrams and Minor Office Expenses.

Trade Subscriptions.

- | | | |
|-----------|--|--|
| Publicity | { Advertising.
Show and Demonstration Expenses
Tendering Expenses.
Travellers' Salaries and Expenses
Patent Fees and Upkeep. | Sub-divided according to class of product concerned as far as practicable. |
| Sales | | |
| Promotion | | |
| | | |

Bad Debts.

Bank Charges.

Law Costs.

Audit Fees.

Directors' Fees.

Property Tax. (Schedule A).

Two items commonly considered as commercial or financial in character are those of cash discounts conceded on sales, and cash discounts obtained on purchases.

Many purchases are not subject to any cash discount, and those purchases that are subject to a cash discount, as distinct from a trade discount, are really invoiced at a correspondingly higher or gross price. The argument sometimes advanced, that cash discounts on purchases arise from financial facilities provided by the commercial side and therefore should go to reduce their expenses, is

misleading so far as it hides what those expenses really are, and is not logical seeing that the same facilities are necessary with net purchases if credit and favourable purchase prices are to be maintained. Exceptional extra discounts for immediate payment, instead of monthly, are admittedly in a different category. Cash discount on purchases should either be deducted from the invoices for cost allocation purposes or included in the works profit and loss account. Commercial
Oncosts.

Cash discounts on sales and agents' commissions can with advantage be deducted from the respective gross sales receipts rather than treated as a commercial oncost to be applied generally.

In some support of the foregoing contention and as throwing further light on the question of commercial oncosts, the following quotation deals with the Government's decision relative to the liquidation of war contracts with the Government :

ESTABLISHMENT CHARGES.

While interest on capital, debentures, and Bank overdrafts are not included, the Government agrees that in future contracts, interest should run at Bank rate as from three months after delivery of the Contractor's account, unless any special difficulty, owing to the nature of the Contract, should present itself. The importance in financial interests of expediting the examination and payment of accounts is impressed by the Treasury on all Contracting departments.

It is admitted that as regards Bad Debts, there may be very special cases where some allowance in oncost would be justified.

The following expenses are not allowed to be included in calculations of oncost :

- i. Discounts on sales (discounts on purchases should be credited in direct costs).
- ii. Expenses of raising capital and discount on loans or debentures (except a fair portion of reasonable expenses of raising such capital).
- iii. Income Tax, Property Tax, and Excess Profits Duty.
- iv. Outward carriage on despatch of goods (inasmuch as this should, where applicable, be allowed in direct cost).
- v. Exceptional donations and subscriptions and exceptional contributions to Trade associations and the like.
- vi. Directors' and staff bonuses, and commissions on profits in so far as they exceed Inland Revenue allowances.
- vii. Profits Insurance and any assurance on lives of Directors or Officials other than the expenses of insuring Officials against explosion and similar risks.
- viii. Royalties and maintenance of Patents applicable to the product in question. These should be properly charged in direct cost, but where not so charged, should be allowed in oncost, the annual fees for maintenance of other existing patents not applicable to Government contracts also to be allowed in oncost.

Details must be disclosed of London or local office expenses solely for selling purposes, agents' and travellers' salaries and commissions, and advertising. Such expenses are *prima facie* allowed in oncost, but in exceptional cases may be excluded. All the above items should be shown separately in returns furnished to the Government.

While the question of what is or is not admissible as oncost in government contracts is not necessarily a guide to correct commercial practice, the points made will be suggestive when it is desirable to define the dividing line between expenditure for legitimate commercial expenses and expenditure that is really a distribution of profit.

Speaking of profit, it would seem to be high time that the term gross profit, in the sense used by the merchant, should be dropped

Commercial
Oncosts.
p. 570.

in favour of a less misleading term. To call the difference between production cost and selling price the *trading margin* would clear the air of many false conceptions of legitimate—and illegitimate—profit.

Investigation
of Production
Oncosts.

Enquiry into the principles for determining the character and incidence of production oncosts can be conveniently dealt with in seven stages :

1. To determine the character or nature of expenditure that shall be treated as works expenses, for application as production oncosts.
2. To determine the classification of works expenses best suited to serve production oncost requirements.
3. To determine to what extent the apportionment of works expenses to departments can be based on ascertainable facts.
4. To determine a suitable basis for apportioning works expenses of a general character to the respective departments.
5. To determine the basis for apportioning departmental production oncosts to the respective producing units in each department.
6. To determine on what basis to charge production oncosts to products.
7. To determine to what extent average totals of works expenses shall be used in assessing the respective departments at any time.

Before proceeding to the consideration of each step, it will be of service to make clear the terms to be used.

The costs allocated to works expenses have to be applied in some appropriate way as departmental oncosts or individual producing unit oncosts, and the procedure of *apportionment* has to be adopted. With a certain number of items, the cost allocation will furnish at once the basis for departmental apportionment, but for the rest some suitable formula has to be found.

Having arrived at the total production oncosts applicable or apportionable to a given department or producing unit, then a *production oncost rate* is computed by means of which the product can be *charged* with its appropriate oncost. The rate may be expressed per unit of direct production time, or of weight or bulk

of product according to the method adopted for its computation. While the practice of applying oncosts as a percentage on wages is not advocated, such a percentage constitutes a rate.

**Investigation
of Production
Oncosts.**

As already explained, production oncosts cover those works expenses pertaining to production up to and including despatch of the product from the works, while all expenses beyond this point fall into the category of commercial oncosts. Some compromise is, however, inevitable if a convenient dividing line is to be drawn between the two classes of oncosts.

**Nature of
Production
Oncosts.**

The dividing line of administrative responsibilities is the natural one to follow and, therefore, it seems right to consider as commercial all the expenses pertaining to selling, financial accounts, general office work and correspondence, other than the works manager's correspondence, which, it may be assumed, will be conducted in the works office—the expenses of which will fall under works administration.

If the buying is done under the works administration, then the expenses of buying fall into works expenses, but under the more usual circumstances, when the buyer is on the commercial staff and outside the jurisdiction of the works, the expenses of his department are more conveniently treated as commercial. The fact that his duties as a buyer are directly on behalf of the works, and to their instruction mainly, may theoretically support the inclusion of the buying department staff charges in the works expenses. It may also be argued that there are other expenses seemingly commercial that should be borne by the works.

Instead of any attempt at the theoretical splitting of expenses that, after all, are entirely general in character and cannot be allocated on much else than an arbitrary basis to the production orders or items of product, it is quite the better way to adhere to the actual line dividing the commercial administration from the works or production administration.

Estimating for commercial purposes, if considered apart from production estimating for technical purposes and payment by results, is another expense that is on the border line, and a decision based on convenience is as justifiable, under ordinary circumstances, as any refinement in dissection.

Works accounting, on the lines developed in this book, should be so integral a part of the works administration that the expenses in connection therewith cannot be very well considered as other than works expenses. When, however, the cost accounts are considered as merely an accessory of the financial accounts with no intimate co-ordination with the works management, it will be

Nature of
Production
On-costs.
p. 481.

probably more equitable to treat the expenses pertaining thereto as commercial expenses.

A list of standing orders for the cost allocation of works expenses is given in Section VI c, and in conjunction with the notes against each it should be clear what items are considered as works expenses.

It is convenient to give here a list of the works expenses that have usually to be dealt with :

- R 1-1 Repairs—Patterns.
- R 1-2 „ Jigs, Special Tools and Gauges.
- R 2-1 Repairs—Land and Buildings.
- R 2-2 „ Motive Power Plant.
- R 2-3 „ Mechanical Transmission.
- R 2-4 „ Electrical Transmission.
- R 2-5 „ Pipe Transmission.
- R 2-6 „ Transportation Plant.
- R 2-7 „ Shop Fixtures.
- R 2-8 „ Special Process Plant.
- R 2-9 „ Machines.
- R 3-1 Repairs—Loose Plant.
- R 3-2 „ Office Equipment (Works).
- S 1-1 Power Generation Expenses.
- S 1-2 Power from Outside Sources.
- S 1-3 Heating Expenses.
- S 1-4 Lighting Expenses.
- S 2-1 Building Attendance.
- S 2-2 Mechanical Plant Attendance.
- S 2-3 Electrical Plant Attendance.
- S 2-4 Belting Attendance.
- S 2-5 Tool Dressing and Sharpening.
- S 2-6 Plant Removal and Alterations.
- S 3-1 Rent, Rates, Taxes, Fire Insurance and Prevention.
- S 3-2 Works Management and Administration.
- S 3-3 Drawing Office General Expenses.
- S 3-4 Works Stationery.
- S 3-5 Sundry Minor Expenses.

- S 4-1 General Stores and Warehouse Expenses.
- S 4-2 Sundry Carriage and Package Expenses.
- S 4-3 Material Testing and Treatment.
- S 4-4 Timber Preparation and Storage.
- S 4-5 Interdepartmental Transportation.
- S 5-1 Accident Compensation.
- S 5-2 National Insurance Expenses.
- S 6-1 Departmental Stores Expenses.
- S 6-2 Departmental Sundries.
- S 6-3 Overtime Expenses.
- S 6-4 General Labour.
- S 6-5 Supervision and Inspection.
- S 6-6 Waiting Time.

Some doubt could arise over rent, rates and taxes, but, if it is not convenient to apportion such expenses between the commercial offices and the works, it will not matter very much usually if the works take the whole burden.

Work expenses for any given factory cannot very well be compared with any outside figures and, so long as they are consistent in their scope from year to year, there is no very serious objection to regularly including some general commercial expense. Where the division can be made easily, or the circumstances make it obviously desirable to do so, as in the case of several factories under one financial combine, then all joint expenses should be carefully apportioned to the proper quarter.

The important point is to locate responsibility for expenses, and there should be no thought of allowing joint expenses to be borne wholly by one party if responsibility overlaps in consequence. Rent, rates and taxes, to keep to the illustration cited, are not controllable in the ordinary sense of the term, and responsibility is, therefore, not affected if the works, as the predominant partner, bears the whole burden.

The stress laid on these points is intended to bring out the necessity of tackling the question of production oncost rates in a spirit of practical compromise instead of seriously attempting purely academic ideals. It must be remembered that all costs are, at best, approximations, and, therefore, the cost accounting system must be devised to give approximations that are sufficiently close to meet the real requirements of the business.

So far as oncost rates are concerned, there are methods in use

Nature of
Production
Oncosts.

that cannot be described, with fairness, as approximations of even a crude character.

The various works expenses can be focussed better if grouped as follows :

1. Building Service.
2. Power Service.
3. Producing Unit Service.
4. Tool Service.
5. Material Service.
6. Departmental Service.
7. Administration Service.
8. Contingency Service.

Classification
of Works
Expenses.
p. 555.

The groups may be defined as "production services,"¹ if considered broadly, and the titles selected will be seen from the tabulation on succeeding pages, of the items included in each group, to be reasonably expressive. The third group, producing unit service, has rather an arbitrary title, though the items included have particular reference to the producing units of the works plant, as distinct from power and other plant of more general service, and, therefore, dealt with under other heads. The group called contingency service involves stretching the meaning of the term service, but may be excused on the ground of convenience. It is obviously very important that the contingencies in question shall not be overlooked in dealing with the matter of production oncosts.

In the following table provisional formulas, or bases, for the apportionment of the respective class totals to the various departments of the works are included for convenience, although the discussion relative to such formulas is given further on.

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Standing order numbers are given by way of cross reference to the notes in Section VI c, as to the possible scope of each heading of expenses.

It will be observed that items of interest and depreciation, that are included, have no standing order reference because no cost allocation of actual expenditure arises.

¹ A. Hamilton Church, an Englishman, writing in 1901, did pioneer work in formulating the principles of oncosts, and in 1909 wrote further articles in which he evolved the terms *production factors* and *production centres*. These terms are in principle synonymous with the terms "production services" and "producing units" used by the author, although their application is appreciably different.

*Tabulation of Works Expense Groups.***Classification
of Works
Expenses.**

Group.	Standing Order No.	Works Expense Heading.	Basis or Formula for apportionment to Departments.
Building Service	R 2-1	Repairs—Land and Buildings (under Building nos.). (less Power Dept. Bldg. if separate).	By percentages based on technical investigation.
	R 2-5	Repairs — Pipe Transmission.	By percentages based on relative departmental replacement values of respective plant concerned.
	R 2-6	Repairs — Transportation Plant.	By percentages based on relative departmental replacement values of respective plant concerned.
	R 2-7	Repairs—Shop Fixtures.	By percentages based on relative departmental replacement values of respective plant concerned.
	—	Interest and Depreciation on capital value of plant named above.	On same basis as repairs.
	—	Provision for expiration of lease.	By apportionment according to the individual value and age of the buildings.
	S 1-3	Heating Expenses.	By percentages based on cubical contents of departmental buildings, subject to technical confirmation.
	S 1-4	Lighting Expenses.	
	S 2-1	Building Attendance.	
	S 3-1	Rent, Rates, Taxes, Fire Insurance and Prevention.	By percentages based on relative departmental replacement values of all buildings and all plant taken together.
Power Service	R 2-1	Repairs—Power Dept. Building (under Building no.).	Grouped together in one sum and apportioned by percentages based on technical investigation, including therein the utilisation of meter records where available (see page 545).
	R 2-2	Repairs — Motive Power Plant.	
	R 2-3	Repairs—Mechanical Transmission.	
	R 2-4	Repairs—Electrical Transmission.	
	—	Interest and Depreciation on capital value of plant named above.	
	S 1-1	Power Generation Expenses.	
	S 1-2	Power from outside sources.	
	S 2-2	Mechanical Plant Attendance.	
	S 2-3	Electrical Plant Attendance.	
	S 2-4	Belting Attendance.	

Classification
of Works
Expenses.

Tabulation of Works Expense Groups—Contd.

Group.	Standing Order No.	Works Expense Heading.	Basis or Formula for apportionment to Departments.
Producing Unit Service.	R 2-8	Repairs — Special Process Plant.	Departmental cost allocation.
	R 2-9	Repairs—Machines.	By percentages based on relative departmental replacement values of plant concerned, or possibly on departmental cost allocation.
	—	Interest and Depreciation on capital value of plant named above.	On same basis as repairs.
Tool Service.	R 1-1	Repairs—Patterns.	The costs under these headings are likely to be of a minor character, if the main charges are booked against the specific order occasioning the repairs. The apportionment in any case can follow, with little error, the lines adopted for Loose Plant Repair Costs.
	R 1-2	Repairs—Jigs, Special Tools and Gauges.	
	R 3-1	Repairs—Loose Plant.	By percentages based on relative departmental replacement values of plant, derived from the annual loose plant inventory. In some cases on departmental cost allocation.
	S 2-5	Tool Dressing and Sharpening.	These costs should be apportioned almost wholly to the machining departments, but if no clear distinction exists, the apportionment basis can be the same as per Loose Plant Repairs.
	—	Annual loss in value of plant concerned as disclosed at stocktaking. Interest on capital value of plant.	On same basis as Loose Plant Repairs.
Material Service.	S 4-1	General Stores and Warehouse Expenses.	By percentages based on relative departmental totals of direct production hours.—Subject to technical confirmation.
	S 4-2	Sundry Carriage and Package Expenses.	
	S 4-3	Material Testing and Treatment.	
	S 4-4	Timber Preparation and Storage.	Total to Woodworking Departments.
	S 4-5	Interdepartmental Transportation.	By percentage based on technical investigation.
	—	Interest on value of materials and product in stock and in progress.	By percentage based on technical investigation.

p. 425.

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Tabulation of Works Expense Groups—Contd.

Group.	Standing Order No.	Works Expense Heading.	Basic or Formula for apportionment to Departments.
Departmental Service.	S 2-6	Plant Removals and Alterations.	Departmental cost allocation.
	S 5-1	Accident Compensation.	By percentage based on relative departmental wages totals.
	S 5-2	National Insurance Expenses.	According to departmental wages sheets.
	S 6-1	Departmental Stores Expenses.	On departmental cost allocation, subject to technical confirmation, if more than one department served.
	S 6-2	Departmental Sundries.	Departmental cost allocation.
	S 6-3	Overtime Expenses.	
	S 6-4	General Labour.	
	S 6-5	Supervision and Inspection.	
	S 6-6	Unproductive or Waiting Time.	
Administration Service.	R 3-2	Repairs—Office Equipment (Works).	By percentage based on relative departmental totals of direct production hours—subject to technical confirmation.
	—	Annual loss in value of above as disclosed at stocktaking.	
	S 3-2	Works Management and Administration.	
	S 3-3	Drawing Office General Expenses.	
	S 3-4	Works Stationery.	
	S 3-5	Sundry Minor Expenses.	
Contingency Service.	—	Estimated Guarantee liabilities on year's products.	By percentages based on relative departmental totals of direct production hours—subject to technical confirmation.
	—	Development and Experimental expenditure not carried forward at end of year.	
	—	Reservation for bad and doubtful stock disclosed at stocktaking.	

p. 380.
p. 572.
p. 573
p. 574.

**Ascertaining
Incidence of
Works
Expenses.**

The next stage is to determine to what extent the apportionment of expenses to the various departments can be based on ascertainable facts.

Easy as it is to realise, in the abstract, the certainty that the different items of expense vary in their true incidence on the production of each department, there is difficulty in arriving at a proper method of placing a definite assessment of the share of each class of expense that should be borne by each department.

There are, of course, some expenses, such as departmental sundries, general labour, and supervision which can quite easily be recorded in separate accounts for each department, and, because of their unquestioned incidence, such expenses are sometimes distributed over the production of each department quite independently of the more general works expenses.

A general repair account is frequently kept for each department, and, if sufficient trouble is taken by all concerned, there need be no reason against the resulting figures being accepted as giving a correct apportionment. The necessary conditions as to carefulness in allocation of costs are not, however, always observed, and deceptive figures may be obtained without anyone's suspicion F 96. being aroused. The use of plant orders for each and every repair means more trouble in the accounts but much better administrative control and more accurate returns.

Allowing that accuracy in this allocation can be relied on, the departmental figures are of limited usefulness for apportionment purposes, particularly for short periods. This is mainly because the expenditure fluctuates so much.

If the fluctuations in departmental costs in this connection are corrected by averaging over the account periods that have elapsed, the figures will be much more equitable as to the share of repair expense to be borne by the production of the current period.

p. 426.

This means departing from the usual conception of a departmental repairs account; and a yet further departure may be advantageous under most conditions, viz., to keep separate repair accounts for each main group of plant and then to apportion the current expenditure among the whole of the departments according to the original value of the respective plant items contained therein.

This is an averaging process of a kind that is the more desirable when all works repairs are dealt with by one department, and, therefore, when the responsibility for the sum total of repair expenses can be centralised.

p. 400.

The splitting up of the plant accounts into groups on the lines suggested does not involve many accounts, if each account serves

the whole works, but would possibly mean too many accounts if departmental sub-accounts are required in each group. Special process plant repairs would under most circumstances require separate departmental sub-accounts.

Ascertainable
Incidence of
Works
Expenses.

It is a point of considerable importance that the divisions of the expense accounts shall facilitate administrative control, and it will be appreciated that grouping the plant repair expenses in this way and then working out the repair costs as a percentage of the replacement values furnishes a valuable basis for comparison. In view of the great alteration in money value following the war, the only consistent basis for purposes such as these is to take replacement values instead of original cost.

Rent is an expense that would appear to be easily apportioned with accuracy to the respective departments on the basis of floor area occupied. Under some conditions this would be substantially true, but usually floor area will be no certain index to the proper incidence of the rent when the character and style of buildings vary greatly, and the relative replacement values of the respective buildings may have to be accepted as the only simple alternative.

Again, rates levied by the local authority take cognisance of the plant located in the various buildings, though no uniformity of practice exists as to the method of assessment. Obviously the incidence of the rates on each department does not follow floor areas, even if the rent does, and there is little alternative to adopting a formula based on the relative departmental replacement values of buildings and plant taken together.

As a reasonable compromise both rent and rates can be apportioned on the basis of buildings and plant replacement values taken together.

In view of the varying method of rating assessment in different districts, the manufacturer needs to give the matter more than ordinary attention. The question is one, indeed, that individual manufacturers are hardly able to deal with properly, and out of their necessities has arisen the Machinery Users' Association, by which joint action is possible and through which expert advice can be obtained.

The unfair burden that arbitrary rating of machinery has thrown on the manufacturer has made it necessary for the aid of legislation to be sought to put matters on an equitable basis. To this end the Machinery Users' Association are identified with seeking the enactment of a bill on the following lines for England—Scotland and Ireland having already got such an arrangement.

Ascertainable
Incidence of
Works
Expenses.

RATING OF MACHINERY BILL

A BILL TO

AMEND THE LAW RELATING TO THE RATING OF HEREDITAMENTS CONTAINING MACHINERY.

WHEREAS doubts have arisen as to how far machinery is to be included or taken into consideration in estimating the value for purposes of local rates of hereditaments occupied for any trade, business or manufacture.

AND WHEREAS the practice with regard to the estimating of such value is not uniform throughout England and Wales

AND WHEREAS the law relating thereto in England and Wales differs from the law in force in Scotland.

AND WHEREAS it is desirable to secure uniformity of practice and to assimilate the law in England and Wales to that which prevails in Scotland.

BE IT THEREFORE enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled and by the authority of the same as follows :—

MEANING OF RATEABLE HEREDITAMENT.

1 In the construction of any enactment relating to the gross estimated rental, gross value, annual value, net annual value, rateable value, or assessable value of any hereditament for the purpose of any local rate, or of the basis of standard thereof, or of any valuation list, or of any water rate, or water rent, the word "hereditament" shall be deemed to include such machinery only as is fixed or attached to the hereditament

MEANING OF FIXED AND ATTACHED MACHINERY

2. In the case of any hereditament occupied for any trade, business or manufacture, the expression "fixed or attached" in the preceding section shall be construed as applying to all machinery, machines or plant in or on the hereditament for producing or transmitting first motive power or for heating or lighting such hereditament but save as herein provided shall not apply to machines, tools or appliances which are only so fixed that they can be removed from their place without necessitating the removal of any part of the hereditament

EXTENT AND SHORT TITLE

3 This Act shall extend only to England and Wales, and may be cited as the Rating of Machinery Act, 1920

p. 416

Depreciation is an expense that lends itself to simple arithmetic in the departmental apportionment, providing, of course, that the value of buildings and plant in use by each department is known, and if the annual depreciation is taken at flat rates for each group of plant, a condition virtually enforced if the financial accounts are to be kept on convenient lines. With the change in money values depreciation rates must now be taken on the basis of replacement values—a point that will have serious consequences if overlooked.

Extra depreciation found necessary, when plant becomes obsolescent and is discarded, to meet the difference between the capital or book value and the realisable value should be recorded against the department concerned.

Power expenses constitute an excellent example of the difficulty in the way of a strictly accurate departmental apportionment; except,

possibly, in those cases where the whole of the power used is electrical and when the consumption by each department can be recorded by meter.

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Incidence of
Works
Expenses.

No one will question that power consumption is a definite factor in any department's expenses for which there ought to be a precise cost available. As a matter of fact the real cost of power for even the whole works, when generated on the works, is not furnished by many systems of costing, the indirect expenses being insufficiently admitted, so that the departmental shares under such conditions cannot be approximately accurate. Apart from that possibility there will be, under most works conditions, little alternative to estimating each department's share of the total power costs, if only by reason of the supplementary consumption of power by such services as hydraulic and pneumatic plant, steam hammers, heating and the losses occasioned in power transmission to the department. Considerable help towards a close estimate will be afforded by tabulating the normal horse-power consumed by each machine and building up the normal requirements of each department, allowing for losses in transmission.

Although frequently revised estimates by a qualified person should be quite satisfactory for accounting purposes, it has to be admitted that the mental conception of a precise departmental power consumption cannot usually be expressed in equally precise figures.

p. 305.

The fourth stage of the enquiry is to determine a suitable basis for apportioning to the various departments those works expenses which are admittedly of a general character.

Apportion-
ment of
Works
Expenses to
Departments.
p 557.

There is little alternative to the adoption of formulas, and, when these formulas are settled after intelligent consideration, they will undoubtedly approximate closely to the real facts of the case.

The suggestions offered are embodied in the table of works expense groups on p. 537 *et seq.*, and are intentionally as simple in form as possible, with a view to the apportionment being carried through as a matter of cost accounting routine every fortnight.

F 135.

This is admittedly a very short period over which to survey production oncosts, but it allows of rising tendencies being detected at the earliest possible stage, when correction is easiest and the loss not yet important. Provision has already been indicated for equalising expenses that cover longer periods than a fortnight.

p. 495.

A treatment for power service expenses has been indicated above on broad lines and will require careful judgment in its application. Power conditions vary too widely for any definite suggestions to apply generally.

The use of direct production hour totals as the basis for apportion-

**Apportion-
ment of
Works
Expenses to
Departments.**

ing some of the expenses is recommended on the ground that time is the one common factor of expenses and production. Expenses necessarily vary directly as the length of period covered or, approximately, as the number of hours worked.

Direct production time may be described as the time occupied on the formative processes that influence the form of the product.

"Direct labour" and "productive labour" are terms frequently applied in this connection, and there is not much room for improvement on the former term. The latter term errs not so much in itself as in its corollary of "non-productive labour." There ought not to be any really non-productive labour in any works and the labour that is neither "direct," nor "secondary" (see page 465) should rather be termed "auxiliary."

The reason for referring to direct production hours rather than direct labour hours is to associate the reference with the producing units, which will sometimes be men and sometimes machines. When one man operates a group of machines, the machine hours will constitute the direct production hours. In another case there may be two men operating one machine, and in both cases the "direct production" hours more obviously indicate the machine hours than would "direct labour" hours.

Judgment will be helped in criticising the effect of using the suggested or other formulas for apportionment to departments if separate plans of the works are used for each of the eight services or groups of expenses as tabulated.

The respective amounts apportioned for a given period can be written on the plan of each building, plant location being indicated and due regard paid to the existence of galleries and upper floors, if any. The idea is to bring relative areas within the review, and generally to stimulate the mental conception of the physical conditions of each department.

**Apportion-
ment of De-
partmental
Oncosts to
Individual
Producing
Units.**

p. 467.
p. 554.

The next or fifth stage is to determine a basis for apportioning departmental oncosts to the individual producing units in the respective departments.

The question of what constitutes a producing unit will hardly be in doubt in any particular department.

In the case of hand work, the worker may be said to be the producing unit, with the aid of such accessories as benching and hand tools.

In the case of machine work, it is convenient to think of the machine as the producing unit and the operator as the accessory, so that there will be no confusion of ideas when one worker operates several machines, or when more than one worker is required to operate a single machine.

While the distinction as to hand work and machine work will be clear in the majority of cases, there will be some workers who alternate between one and the other. The tool room may provide typical instances, although the increasing tendency to specialisation

Apportionment of Departmental Oncosts to Individual Producing Units.

<i>Apportionment of Departmental Oncosts between Hand and Machine Sections.</i>	
Building Service.	Divided on ratio of floor areas actually occupied.
Power Service.	All to Machine section subject to deduction for hand-workers' use of pneumatic, electric and hydraulic tools; also for transportation power consumption in the case of heavy hand work.
Producing Unit Service.	All to Machine section. The equivalent service for the Hand section is included in the Building Service apportionment. Special process plant expenses may affect either Hand or Machine sections, and can only be dealt with according to technical investigation.
Tool Service.	Apportioned to the Hand section according to technical investigation, but usually not exceeding the ratio of the number of hand units to machine units. The balance to go to the Machine section.
Material Service. Departmental Service. Administration Service. Contingency Service.	Divided according to ratio of total hand production hours to total machine production hours—subject to technical confirmation.

lessens the probabilities of finding many cases anywhere. A compromise must be made to fit the circumstances, and this will usually mean treating the workers in question as hand workers with more accessories, in the form of machines, than is usual. This is almost certain to be the right treatment in the pattern shop, though here the advent of pattern-making machines operated by a special man

Apportionment of Departmental Oncosts to Individual Producing Units.

is resulting in the pattern-maker becoming more exclusively a hand worker.

It may be safely assumed that in every department the producing units to be recognised in the allocation of departmental expenses can be resolved into either hand or machine sections.

Following from this, there will be many departments containing both kinds of producing units. Some basis must, therefore, be established for first dividing the total departmental expenses between the two sections before proceeding to deal with the individual units.

Some suggestions are given on page 545 as to the lines of division that may be followed.

Having settled the total oncosts to be borne by the respective sections in any department, the next step is to arrive at the average oncost rate per hour that would distribute these oncosts.

In some departments these average or flat rates per hour can be adopted with little hesitation for use as the proper production oncost rate for all the hand or all the machine units in the department.

In the matter of hand work, this will be the general case, except possibly for certain hand workers having exceptional accessories not in use by the others in the department.

With machine work, the average rate is really only permissible where the machines throughout the department are fairly uniform in character.

F 136. In any case it is only to this stage that the investigation of oncost rates can economically be carried out each fortnight, nor are further statistics likely to be of much use for frequent comparison.

p. 68. The difference for any period between the total production oncosts applied to direct labour in any department, and the works expenses apportioned to the department may conveniently be expressed as a percentage of over- or under-distribution of oncosts. Statistics in this form will guide the management as to the urgency of modifying the oncost rates in use. Such modification is not, however, recommended at any but rare intervals as vitiating the comparisons of the figures for different periods.

The completion of the stage under discussion resolves itself mainly into apportioning the machine section total oncosts to the individual machine units and the hand section total oncosts to the hand units. F 64. The procedure in both cases will be similar, though the machine units are more particularly considered in the following suggestions :

Apportionment of Departmental Oncosts to Individual Producing Units.

Apportionment of Departmental Oncosts to Individual Producing Units.

Building Service.	<p>By percentage based on ratio of net area, occupied by the individual producing unit, to the total departmental area.</p> <p>Net areas should include the space required for working each machine.</p> <p>This plan automatically deals with non-producing areas by proportionately increasing the incidence on the producing areas.</p>
Power Service.	<p>By percentage based on the ratio of average power used by the individual unit to the average total power consumed in the department. This automatically spreads transmission losses in proportion to the net power used.</p> <p>To arrive at the average power used by individual machines, specific tests may be necessary on representative machines. The belting capacity is rarely a safe guide to the power consumed.</p>
Producing Unit Service.	<p>By percentage based on replacement value of individual items, subject to technical investigation—particularly in the case of Special Process Plant.</p>
Tool Service.	<p>By percentage based on technical investigation.</p>
Material Service.	<p>By same percentage as Producing Unit Service, or, when the producing units are of uniform character, by sub-division, according to the number of such units.</p>
Departmental Service.	<p>Same basis as Material Service.</p>
Administration Service.	<p>By sub-division according to the number of producing units.</p>
Contingency Service.	<p>Same basis as Administration Service.</p>

**Application
of Production
Oncost Rates.**
p. 64.

The sixth stage is to determine on what basis to apply the individual oncost rates.

The major portion of production oncosts have a time relation and rise or fall according to the length of the period covered. Their amount also reflects the numbers employed, so that the number of hours occupied in production or time worked affords a more logical basis than the wages paid. Under certain rare conditions of repetition, the wages paid may serve well enough as an alternative to the time worked, but is not well adapted to meet changes in conditions. Other matters favour the use of the time basis, particularly when payment by results is in vogue, whether individually or collectively. A saving of time worked may not mean a decrease in wages cost per piece, but does mean a decrease in production oncosts per piece by reason of there being greater output in a given time. One notable evil of using the wages basis is to encourage the use of cheap labour, when skilled labour at a little higher rate might be employed with really better economy, if total costs are considered.

Where the wages basis is used the oncost rate is expressed as a percentage, whereas with the time basis the rate is expressed as a positive amount per hour worked. This in itself is of great administrative use in comparing departmental and period results, especially when wages rates alter, as so frequently happens.

The period for which the expense figures are taken will contain a certain number of working hours, and the obvious course to take is to divide the total production oncosts by the number of hours worked and so arrive at an oncost rate per hour. The total oncost in question may be as apportioned to the department as a whole or as apportioned to the individual producing unit, thus giving either departmental oncost rates or individual unit oncost rates.

Having worked along these lines to arrive at the oncost rates, it might seem unnecessary to offer any discussion of the method frequently adopted of applying oncost rates as a percentage on the workers' wages. As a matter of fact, such a practice is usually only condoned as being particularly easy, and the percentages used are rarely the outcome of any serious consideration of the real facts of the case.

For commercial estimating purposes, a percentage on wages to cover works expenses is more readily applied, as close discrimination is not usually possible at that stage, and the method is the one that the commercial man is trained to use.

There is nothing to prevent hourly oncost rates being converted

into a percentage of the worker's hourly wage, or into a percentage of the departmental average hourly rate. This course may be advantageously adopted in settling the percentages to be used for the purposes of commercial estimating.

One objection to a percentage-on-wages plan is that in the case of piecework the costs never decrease, according to the accounts, however much the time taken may be reduced. This result has helped to induce the feeling that with piecework the prices must be cut if any saving is to be effected, whereas, with the oncosts applied on the basis of time worked, the saving of time would be seen to correspondingly reduce the oncost sufficiently to show an appreciable net gain to the employer at the same time as the worker enhances his hourly earnings—refer diagram on page 133.

The following example will illustrate the point. The assumption is that the piece rate is 2s. 8d. per piece, the man's time rate 1s. 4d. per hour, the oncost rate 1s. 4d. per hour or alternatively 100 per cent. of the direct wages, though that does not follow exactly if the time rates of the different workers vary from the rate of 1s. 4d. used in the illustration.

Time taken per piece.	Time wages earned.	Extra pay earned.	Total Earnings per hour worked.	Direct Labour cost per piece.	Percentage Plan.		Time Basis.	
					Production On-cost at 100% on direct labour.	Total cost exclusive of material.	Production On-cost at 1s. 4d. per hour	Total Cost exclusive of material.
1½ hrs.	2/-	8d.	1/9½	2/8	(a) 2/8	a+b 5/4	(c) 2/-	a+c 4/8
1 hr.	1/4	1/4	2/8	2/8	(b) 2/8	5/4	1/4	4/-

It will thus be seen that if the piece is made in 1 hour instead of 1½ hours, the worker's earnings per hour increase from 1s. 9½d. to 2s. 8d., while the total production cost exclusive of material per piece falls from 4s. 8d. to 4s., if the saving in time taken is recognised in charging the oncost.

Another objection to the percentage method lies in its failure to discriminate between the true cost of efficient and inefficient labour, if the hourly rates of wages differ, as is likely to be the case.

A further illustration (page 550) will emphasise the point, and to simplify it timework is assumed, though otherwise the figures of the previous example apply.

When regard is paid to the fact that the machine is likely to be longer in use by the lower rated worker, the fallacy of the percentage-on-wages plan will be evident—not to mention the loss of turnover,

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of Production
Oncost Rates.

**Application
of Production
On-cost Rates.**

and therefore profit, by the smaller output in a given time from the less skilled workers. In the illustration given below, the total cost of work done by the apprentice, when paid at half the mechanics time rate, is 8d. more than in the case of the mechanic, if time taken is recognised.

Worker.	Hourly Wage Rate.	Time Taken per Piece	Time Wages per Piece.	Percentage Plan.		Time Basis.	
				Production On- costs at 100% on direct wages.	Total Cost exclusive of material	Production On-costs at 1s 4d. per hour worked	Total Cost exclusive of material.
			(a)	(b)	a + b.	(c)	a + c.
Apprentice -	8d.	3 hrs.	2/-	2/-	4/-	4/-	6/-
Improver -	1/-	2½ hrs.	2/6	2/6	5/-	3/4	5/10
Mechanic -	1/4	2 hrs.	2/8	2/8	5/4	2/8	5/4

The argument of those who use the percentage-on-wages plan, is that for a given job the wages rates of different workers will not vary widely, that men will not be given boys' jobs and *vice versa*. This point rather fails if average percentage rates are used, for certainly cheap labour does not always operate "cheap" machines.

There is one condition of affairs that may render the percentage plan innocuous, and that is when contracts are large and costs are only considered in the bulk. In this case the total production on-costs charged to each contract may, by the law of averages, approximate to the proper figure as closely by the use of percentages as of hourly rates, but there is no guarantee of this occurring for every contract. The same reasoning can alone justify the use of percentages on material and wages cost combined, considered from a costing point of view, although, for commercial estimating, trade practice may make such a course convenient, if risky.

p. 32.
p. 554.

**Normal
Works
Expenses.**

The seventh and concluding stage of enquiry is to determine to what extent average figures of works expenses shall be used for assessing the various departments.

Obviously if the object is to charge out to a nicety the actual expenses incurred, the proper rates to be used can only be known at the end of the period concerned. This involves delay and practically compels the adoption of flat rates to the disregard of differing conditions.

An alternative to waiting is to estimate the expenses likely to be incurred under the conditions that will probably obtain during the period in question. This is obviously a difficult matter.

An outstanding objection to both these courses is that the rates will fluctuate widely in periods of varying activity.

Normal
Works
Expenses.

The proper course is to base the oncost rates on the expense figures that will obtain when the factory is working efficiently as regards the volume of output. Such expenses may be considered as the normal, and the oncost rate based on same may also be termed normal.

These normal production oncost rates may be taken as the lowest that can be used with safety in estimating costs, and all orders obtained at a price that allows a sufficient margin for commercial oncosts and profit over and above the works costs, including therein, normal production oncost charges, should be profitable orders.

In practice it usually happens that the trading margin of selling prices over production costs fluctuates widely on different orders, and selling expenses can frequently be traced as being very irregular. The blend of business needs to be such as will ensure a satisfactory net profit at the end of each year.

p. 532.

If the contention can be admitted that commercial estimates of costs should always be prepared on normal lines as regards the provision for oncosts—whether the selling price bears any regular relation to the estimated costs or not—it will give much more value to the actual cost figures if the production oncosts are applied at normal rates in the cost allocation accounts.

There is another and perhaps more important reason for using normal oncost rates in the works accounts, and that is to set up some standard by which the departmental production may be compared.

p. 67.

If the oncosts as applied to the production of any department for a given period, amounts to a less total than the actual expenses apportioned to that department, it may be assumed that the volume of production is below the normal or accepted efficiency level.

The departmental inefficiency indicated in this way might have reference to an undue growth of expenses incurred within the department itself, or an undue growth of the works expenses generally, which consequently burdens the department beyond the point that its current production will carry.

In arriving at the normal works expenses for a normal output there should be a close examination of all the data available.

Opinions will differ as to what is to be considered the normal output for a given factory, and, while three-fourths of the factory's full capacity is suggested as a suitable standard, the decision must depend on local factors.

The higher the proportion taken the greater the volume of production necessary to realise the normal conditions or efficiency level.

**Normal
Works
Expenses.**

On the other hand, the higher the assumed output efficiency level the lower will be the normal production oncosts, and the easier, presumably, to obtain the requisite volume of business.

p. 574.

A question that will arise from the use of normal production oncost rates is the balance of expenses under-distributed or over-distributed by this means. Provision for this is made in con-

F 163 nection with the works accounts annual abstract.

**Calculations
for Produc-
tion Oncost
Rates.
p. 38.
p. 362.
p. 382.
p. 447.**

It will be quite obvious that the stages suggested for arriving at production oncost rates, either departmental or individual, will involve a number of calculations outside the range of ordinary ready reckoners.

The slide rule, as an alternative, is not a very satisfactory method of calculation in matters pertaining to accounts, if only that the practice that makes perfect is liable to be lacking. Logarithms are fairly rapid, easily learnt and sufficiently accurate. Mechanical means, on the other hand, of a kind suitable for percentage calculations cannot be utilised very much in currency calculation.

By adopting the practice of computing all rates, for whatever purposes, in terms of the decimalised shilling, that is, in shillings and decimals of a shilling, mechanical calculations become of service, while there is now a ready reckoner¹ on the market enabling rapid extension of decimalised shilling rates to be made to the nearest farthing.

There are also master tables² published which are applicable for calculating percentages for expense apportionments and the like, and for making ready reckoners for applying percentages of frequent occurrence.

**Process
Charges.**

In connection with certain departments, such as iron foundry, brass foundry and smithy, it is better to charge some expenses by what is termed a process charge, which is applied on the basis of the weight of output.

This, of course, reduces the total expenses to be dealt with by oncost rates applied to the direct labour, as indicated in the notes on page 505.

**Material
Service
Charges.
p. 35.
p. 538.**

There are expenses in connection with materials which are obviously directly related to the bulk or weight in question, rather than to its initial purchase cost or the amount of labour afterwards expended in working the material.

¹ The *Universal Wage Calculator*—Library Press, Ltd.

² *Cotsworth's Direct Calculator*—M^cCorquodale & Co. Ltd.

Where this fact is considered worth special recognition, a material service charge can be applied. This would mean excluding some or all of the expenses included under material service in arriving at oncost rates. Material
Service
Charges.

In the system of cost allocation accounts offered, the material service charges would be applied on the material cost allocation sheets concerned, and summarised under the general heading of production oncosts in the cost ledger.

There are difficulties in the way of checking the book-keeping accuracy of the initial entries, and, further, the departmental oncosts statistics become somewhat dislocated for comparative purposes.

These disadvantages, in some instances at least, may not be serious enough to make the use of material service charges undesirable. A typical case is that of timber, to which exceptional expenses attach as regards cutting, drying, storage and wastage. The alternative that is sometimes adopted is to include these expenses in making up the oncost rates on direct wages in the wood-working department.

p. 377.

Another way, which, under the present system, would be irregular, is to increase the rate used for the timber in the cost allocation accounts. This course could be made a regular one by charging the expenditure in question as a works product, to be accounted for under "materials."

Another possible case for a material service charge is steel that has to be case-hardened, or for that matter any other species of heat treatment. The costs of case-hardening cannot be allocated satisfactorily by any ordinary method, yet it might be better to distribute by an arbitrary charge on the material rather than be forced to treat the costs as a works expense to be borne generally.

p. 487.
p. 500.

Perhaps the most important case to consider is that of factored goods which, under a system of applying production oncosts to wages only, escape their proper charge in the works accounts for handling and storage.

Reference is necessary to a fairly common practice of applying a flat percentage charge to all materials on the basis of values. This is hardly a serious attempt at a material service charge, in the sense meant here, as obviously values are no index to the incidence of material service expenses.

Some firms use a percentage, as high as twenty, on the grounds that they are merchanting the material and should apply a merchant's commission. The essential difference is that the merchant's commission is to cover selling expenses and profit, neither of which pertains to works costs.

The use of flat percentage charges on material values is easy, and

**Material
Service
Charges.**

raises no doubt in the mind of the ordinary commercial man. Incidentally the practice disposes of a considerable proportion of works expenses, which the commercial man is ever ready to question when their ratio to direct labour is declared in its true light.

The adoption of such arbitrary methods in the cost accounts will be hard to justify, and, when they are permitted, it is absurd to attempt any refinement in dealing with the remainder of the works expenses.

p. 32.

The practice no doubt arose from adding a percentage of profit to material costs in building up selling prices. While there should be a certain parallel between cost data and selling prices, it is not desirable to import into works accounting the purely arbitrary methods that so often operate in fixing selling prices.

**Interest
Charges.**
p. 529.
p. 559.
p. 575.

In considering production oncosts the question arises as to how to deal with interest charges on capital employed in production.

From the financial account point of view, interest can only be met out of profits, or rather, interest on capital constitutes profit.

To include an interest charge as an element of works expenses is, in a sense, to include an anticipated profit as an expense, which is fundamentally unsound.

There is the other view that if the buildings and plant were rented, the rent charged and accepted as an expense, would include interest on the capital value involved, and that it is self-deception to make no charge for rent, when the property is owned by the manufacturer.

Some recognition of the capital values involved in any process is necessary, if the production oncost rates are to be equitable.

p. 544.

In dealing with works expenses as a whole, or by departments, the influence of interest is less disturbing than when fixing the oncost rate for individual producing units.

Taking the instance of a machine of the capital value of £500, interest on that amount at 5 per cent. would be £25 per annum.

If the working hours are assumed as being 40 per week for 50 weeks in the year, in other words 2000 hours per annum, the interest charge per hour will work out at 3d. per hour.

Comparing this with another machine, value £50, the interest charge on the same basis would be only 0.3d. per hour—a net difference of 2.7d. per hour for interest alone.

If, however, it is held that it is not admissible to include interest on capital in the financial accounts, an interest charge can be temporarily assumed for cost accounting purposes, and gross individual oncost rates arrived at that will be in excess of the normal rates by the same percentage as the gross expenses (net

expenses plus the total interest charges assumed) exceed the net expenses. Thus, if the total capital value of machinery in a department is £5,000, the total interest charge at 5 per cent. will be £250 per annum. Supposing the net departmental expenses total to £6,250 per annum, then the gross expenses will be £6,500, or four per cent. in excess of the net expenses.

Interest
Charges.

The recommendation is that the gross individual oncost rates, which include the assumed interest charge appropriate to each, shall be reduced to net rates by a flat percentage deduction—in the present illustration of four per cent.

Continuing the illustration, if the gross oncost rate for the £500 machine worked out to be 1s. per hour and for the £50 machine 9d. per hour, the net rates would be 4 per cent. less, viz. 11½d. (say 11¼d.) and 8½d. (say 8¼d.) respectively.

The ratio of the two rates remains unaltered, viz. 4 : 3, and the more expensive machine is adequately charged without the sum total of production oncosts, as applied by the net rates, being in excess of the net works expenses, as recognised in the financial accounts.

Consideration must now be given to the accounting necessary in connection with production oncost.

Production
Oncosts
Accounts.
F 162.

By means of a works cost allocation abstract the works expenses for each account period are reported to the financial department, and on the same abstract is given the total production oncosts as applied to the various orders series.

p. 444.
p. 477.

As regards grand totals the financial accounts can be completed from these abstracts in respect to works expenses incurred and production oncosts applied to orders without further information from the works accounts office.

It is necessary, however, for arriving at production oncosts properly to have as part of the cost accounting system a *Production Oncosts Book* in which are recorded the details of the works expenses, their apportionment to departments for calculating oncost rates, and the results of applying those rates.

F 134.
F 135.
F 136.

Production Oncosts Book—Tabulation of Accounts.

DR.	<i>Building Service Account.</i>	CR.
Memorandum entries of cost allocations from Cost Ledger * (Standing Orders).	Transfers to—	
Transfers from Annual Depreciation Account.	Departmental Oncost Ac- counts	
Transfers from Interest on Capital Employed Account.	Departmental Process Sum- mary Accounts.	

* Form F 132.

p. 537.

**Production
Oncosts
Accounts.**

Production Oncosts Book—Tabulation of Accounts, contd.

p. 537.

DR.	Power Service Account.	CR.
Memorandum entries of cost allocations from Cost Ledger (Standing Orders)	Transfers to— Departmental Oncost Accounts.	Ac-
Transfers from Annual Depreciation Account.	Departmental Process Summary Accounts.	Sum-
Transfers from Interest on Capital Employed Account.		

p. 538.

	Producing Unit Service Account.	
Memorandum entries of cost allocations from Cost Ledger (Standing Orders)	Transfers to— Departmental Oncost Accounts	Ac-
Transfers from Annual Depreciation Account	Departmental Process Summary Accounts.	Sum-
Transfers from Interest on Capital Employed Account.		

p. 538.

	Tool Service Account.	
Memorandum entries of cost allocations from Cost Ledger (Standing Orders)	Transfers to— Departmental Oncost Accounts.	Ac
Transfers from— Drawings and Patterns Stock Account Jigs, Special Tools and Gauge Stock Account Loose Plant Stock Account, representing loss anticipated at stocktaking.	Departmental Process Summary Accounts.	Sum-
Transfers from Interest on Capital Employed Account.		

p. 538.

p. 532.

	Material Service Account.	
Memorandum entries of cost allocations from Cost Ledger (Standing Orders).	Transfers to— Departmental Oncost Accounts.	Ac-
Transfers from Interest on Capital Employed Account.	Departmental Process Summary Accounts.	Sum-

p. 505.

p. 539.

	Departmental Service Account.	
Memorandum entries of cost allocations from Cost Ledger (Standing Orders).	Transfers to— Departmental Oncost Accounts.	Ac-
	Departmental Process Summary Accounts.	Sum-

In the case of departments for which process accounts are kept, such as iron foundry, brass foundry and smithy, the expenses falling under the heading of departmental service are better charged direct to the respective process summary accounts.

p. 561.

*Production Oncosts Book—Tabulation of Accounts, contd.*Production
Oncosts
Accounts.

DR.	<i>Administration Service Account.</i>	CR.
Memorandum entries of cost allocations from Cost Ledger (Standing Orders).	Transfers to— Departmental Oncost Accounts.	
Transfer from Office Equipment (Works) Stock Account representing loss anticipated at stocktaking.	Departmental Process Summary Accounts.	

p. 539.

Contingency Service Account.

Transfer from Guarantee Account representing estimated guarantee liabilities on preceding year's output, as to replacement of defective parts within, say, one year of sale	Transfers to— Departmental Oncost Accounts	
Transfer from Development and Experimental Account representing anticipated expenditure to be written off for the year	Departmental Process Summary Accounts	
Memorandum entry of anticipated deduction from general stock in inventory to cover bad and doubtful stock.*		

p. 539.
p. 572.
p. 573.
p. 574.*Departmental Oncosts Account.*

Transfers from— Building Service Account. Power Service Account Producing Unit Service Account Tool Service Account. Material Service Account Departmental Service Account. Administration Service Account Contingency Service Account	Memorandum entries of Departmental Oncosts charged as per Wages Allocation Summary † Balance, if any, transferred to Production Oncosts Supplementary Account.
Transfer from— Extra Depreciation (obsolescence) Account	

p. 543.

Separate accounts will be necessary for each department, other than those provided for by the Process Summary Accounts.

Annual Depreciation Account.

Memorandum entry of depreciation for year—to be reported in Works Accounts Annual Abstract.	Transfers to— Building Service Account. Power Service Account. Producing Unit Service Account.
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p. 416.
p. 573.

* Form F 163. ◀

† Form F 30.

Production
Oncosts
Accounts.

Production Oncosts Book—Tabulation of Accounts, contd.

Separate accounts will be necessary under the following heads :

Land and Buildings.
Motive Power Plant
Mechanical Transmission.
Electrical Transmission.
Pipe Transmission.
Transportation Plant.
Shop Fixtures.
Special Process Plant
Machines.

p. 57.

In the case of leasehold property, provision for the expiration of the lease needs to be included as an annual charge dependent on the conditions and further duration of the lease.

p. 416.
p. 574.

DR. *Extra Depreciation (Obsolescence) Account.* CR.

Memorandum entries of extra depreciation on discarded plant items, representing difference between book or capital value and realisable value of such plant. The entries should be made at same time as Departmental Capital Values Accounts are credited with realised values or stock values of discarded plant.

Transfers to—
Departmental Oncosts Accounts.
Departmental Process Summary Accounts.

It may be necessary to have separate accounts for each department to facilitate the transfers crediting this account.

Analysis under the various plant headings (see Annual Depreciation Account above) will be necessary for the purposes of the Works Account Annual Abstract. This is likely to be sufficiently simple a matter to require no separate sub-division of this account.

p. 422.

Departmental Capital Values Account.

Memorandum entry of capital value at beginning of year of buildings and plant appropriated to department's use

This may have to be based on a Works valuation, but the sum total of capital values in all departments must agree with the financial accounts

Memorandum entries of Works Additions Costs, as per Plant Orders Cost Summary,* from which the totals appearing on the Works Cost Allocation Abstract are derived.

Memorandum entry of annual depreciation on department's buildings and plant.

The same totals appear in the Annual Depreciation Account divided under the headings adopted in the financial accounts.

Memorandum entries of stock values or realised values of discarded plant.

Memorandum entries of extra depreciation corresponding with the totals figuring in the Extra Depreciation Account.

Memorandum entry of capital value at end of year of department's building and plant.

* Form F 137.

*Production Oncosts Book—Tabulation of Accounts, contd.*Production
Oncosts
Accounts.

Separate accounts are necessary for each department, and in each case provision should be made for dissecting the entries under the various headings of plant adopted in the financial accounts.

In view of altered money values, a general revision of book values is necessary in the financial accounts, which must be reflected here, or alternatively higher depreciation rates must be used when applied on pre-war values.

DR. *Interest on Capital Employed Account.* CR.

Memorandum entry of interest on capital employed in each department in plant, material and stock—to be reported in Works Accounts Annual Abstract.

Transfers to—
Building Service Account.
Power Service Account.
Producing Unit Service Account
Tool Service Account.
Material Service Account.

p. 51.
p. 554.
p. 575.

Separate accounts are necessary for each department. The fire insurance schedule, if properly prepared, may be of service in settling the amount of capital involved in each department. The Master Printers' Federation have adopted 6 per cent. as the rate of interest to be charged in this way.

Discarded Plant Stock Account.

Memorandum entry of stock values brought forward at beginning of year, in conformity with the financial accounts.

Memorandum entries of stock values of unsold discarded plant from Cost Ledger (Standing Order). These stock values will be reduced by credits in respect to disposal of plant.

Memorandum entry of stock values carried forward at end of year as per Works Accounts Annual Abstract.

Balance, if any, transferred to Production Oncosts Supplementary Account.

p. 411.
p. 497.

Drawings and Patterns Stock Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts.

Memorandum entries of costs of additions from Cost Ledger (Standing Order).

Memorandum entry of values carried forward at end of year, as per Works Accounts Annual Abstract.

Loss in value anticipated at stock-taking transferred to Tool Service Account.

Balance reported on Works Accounts Annual Abstract.

p. 400.
p. 467.

**Production
Overcosts
Accounts.**

Production Overcosts Book—Tabulation of Accounts, contd.

p. 400.
p. 467.

DR. Jigs, Special Tools and Gauges Stock Account. CR.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts

Memorandum entries of cost of additions from Cost Ledger (Standing Order).

Memorandum entry of values carried forward at end of year, as per Works Account Annual Abstract.

Loss anticipated at stocktaking transferred to Tool Service Account.

Balance reported on Works Account Annual Abstract.

p. 403.
p. 425.

Loose Plant Stock Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts

Memorandum entries of costs of additions from Cost Ledger (Standing Order).

Memorandum entry of values carried forward at end of year, as per Works Account Annual Abstract.

Loss anticipated at stocktaking transferred to Tool Service Account.

Balance reported on Works Account Annual Abstract.

p. 404.
p. 432.

Office Equipment (Works) Stock Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts

Memorandum entries of costs of additions from Cost Ledger (Standing Order).

Memorandum entry of values carried forward at end of year, as per Works Account Annual Abstract.

Loss disclosed at stocktaking transferred to Administration Service Account

Balance reported on Works Account Annual Abstract

p. 493.
p. 571.

Scrap Stock Account.

Memorandum entries of total scrap stock values for each account period from Cost Ledger (Standing Order)

Memorandum entries of total scrap stock additions for each account period, as entered in Finished Stock Product Summary.*

This account is provided merely to agree the totals indicated.

p. 492.
p. 571.

Sales Returns Stock Account.

Memorandum entries of stock value of total sales returns for each account period, as entered in Works Account Register.

This account is only of service as a summary for statistical purposes.

When goods are returned from sale there is not usually any works account affected, and the only provision to make is for

*Production Oncosts Book—Tabulation of Accounts, contd.***Production
Oncosts
Accounts.**

the general stock to be debited at a proper figure for the accession to stock. This is done through the periodical works product abstract, which includes the total works value of items specially recorded in the finished stock product summary as saleable goods received back into stock.

F 161.

F 119.

DR. Departmental Process Metal Accounts. CR.

Memorandum entry of metal values of work-in-progress brought forward at beginning of year, in conformity with the financial accounts.

Memorandum entries of metal costs from Cost Ledger (Standing Orders).

Memorandum entries of metal charges as per Process Product Summary.*

Memorandum entries of costs of ascertained metal losses from Cost Ledger (Standing Order)

Memorandum entry of metal values of work-in-progress carried forward at end of year, as per Works Accounts Annual Abstract.

Balance, if any, transferred to Departmental Process Summary Account.

p. 504.
p. 507.
p. 508.
p. 509.
p. 515.
p. 517.

Departmental Process Summary Account.

Memorandum entry of work-in-progress inventory values (less metal values) brought forward at beginning of year, in conformity with the financial accounts

Memorandum entries of process costs from Cost Ledger (Standing Orders).

Transfer from—

Building Service Account.
Power Service Account
Producing Unit Service Account
Tool Service Account
Material Service Account.
Administration Service Account.
Contingency Service Account.

Transfer from—

Annual Depreciation.
Extra Depreciation Account.

Transfer from—

Departmental Process Metal Account.

Memorandum entry of works value (less metal charges) of process product, as per Process Product Summary.

Memorandum entry of work-in-progress inventory values (less metal values) carried forward at end of year, as per Works Accounts Annual Abstract

Balance, if any, reported on Works Accounts Annual Abstract.

p. 503.
p. 504.
p. 505.
p. 517.
p. 573.
p. 578.

Separate accounts will be necessary for each department to which process accounts apply.

These two accounts may be kept for convenience in separate process account books for each department concerned.

The balance, whether of over or under-charge, is embodied in the works profit and loss account.

F 164.

* See Form F 118.

**Production
Oncosts
Accounts.**

Production Oncosts Book—Tabulation of Accounts, contd.

p. 523.
p. 573.
p. 578.

DR. *Stock Production Differences Account.* CR.

Memorandum entries of undercharges on stock product, as noted in Cost Ledger (Stock Production Orders).

Memorandum entries of overcharges on stock product, as noted in Cost Ledger (Stock Production Orders).
Difference, or balance, if any, reported on Works Accounts Annual Abstract.

F 132.

Where deliveries under a given stock production order are numerous, separate accounts may be necessary to collate the value of the various deliveries as charged alongside the total cost, to arrive at the under or overcharge on that order.

The resulting balance on this account is embodied in the *works profit and loss account*.

F 164

p. 11.
p. 36.
p. 572.
p. 574.

Guarantee Expenditure Account.

Memorandum entries of Guarantee Order costs, as per Delivered Orders Cost Abstract. (F 138).

Transfer to Contingency Service Account of estimated guarantee liabilities on year's output.

The balance on this account must be treated with caution, as guarantee liabilities may not mature with any regularity. The value of the account lies in furnishing the management with data as to the provision to be made in the production oncosts year by year (see p. 557).

Development and Experimental Account.

p. 471.
p. 572.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts.

Memorandum entries of development and experimental costs during year, as per Works Cost Allocation Abstracts.

Transfer to Contingency Service Account of anticipated expenditure to be written off for the year.
Memorandum entry of values carried forward at end of year, as per Works Accounts Annual Abstract.

Balance reported on Works Accounts Annual Abstract.

The balance, being the expenditure to be written off in excess of the amount provided for in the production oncosts (p. 557), must be included in the works profit and loss account.

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*Production Oncosts Book—Tabulation of Accounts, contd.*Production
Oncosts
Accounts.

DR.	<i>Expenditure Adjustments Account.</i>	CR.
Memorandum entry of expense payments in advance brought forward at beginning of year, in conformity with the financial accounts.		Memorandum entry of expenses liabilities (not charged) brought forward at beginning of year, in conformity with the financial accounts.
Memorandum entries of total suspense debits each account period, from Cost Ledger (Standing Order).		Memorandum entries of total suspense credits or transfers to other accounts, from Cost Ledger (Standing Order).
Memorandum entry of expense liabilities (not charged) carried forward at end of year, as per Works Accounts Annual Abstract.		Memorandum entry of expense payments, in respect to following year, carried forward at end of year, as per Works Accounts Annual Abstract.

p. 495.

This account is occasioned by the desirability of holding long period payments, such as insurance, in suspense and the consequent necessity to transfer appropriate amounts to particular expense accounts each account period. There will be other cases, such as rent, where the position is reversed and the expenditure has to be anticipated to complete the current expense accounts.

If the firm carries its own risk as to workmen's accident compensation, instead of insuring, a separate suspense account will be necessary.

Production Oncosts Supplementary Account.

Transfers from Departmental Oncost Accounts in respect to balances of expenses not applied or distributed by the normal Oncost rates.	Memorandum entry of supplementary charging of production oncosts, requisite to balance this account at end of year, as reported in the Works Accounts Annual Abstract.
Transfer from Discarded Plant Stock Account in respect of balance of unsold discarded plant debited to stock and not otherwise disposed of by the accounts	In this supplementary charging the total in question will be divided between Sales Orders, Sales Repairs and Sundries Orders, Process and Stock Production Accounts, in the same ratio as the total production oncosts are already applied for the year in each division.
Memorandum entry of costs written back on Works Additions, as aggregated under Standing Order U3-4, p. 497.	
Memorandum entry of Cost Allocation Differences as aggregated under Standing Order U3-3, p. 496.	

p. 497.
p. 498.

It would be equally effective and probably involve little error in the incidence of the above items of oncosts if they were dealt with directly in the works profit and loss account (see F 164).

**Production
Oncosts
Accounts.**

In the preceding tabulation of these accounts it will be noted that most of the entries necessary are indicated as being memorandum entries. This arises from the fact that these accounts are auxiliary to the cost accounts as aggregated in the cost ledger, and are only indirectly interlocked with the financial accounts. It will, all the same, be readily appreciated that only through such information as these memorandum accounts furnish can the charging of production oncost to orders be carried out with any certain efficiency and accuracy, or a works profit and loss account be built up from the works accounts.

[VI A—p. 440—General Scheme of Cost Accounts.]
 [VI A—p. 444—Diagram of Cost Accounting Stages.]
 [VI B—p. 449—Cost Allocation.]

VI G

COST RETURNS

It is convenient to consider as cost returns all summaries and abstracts prepared by the works accounts office relative to costs. This definition gives a wide field of operation, as will be shewn.

In the system of cost accounts outlined in this book the following are the main heads under which cost returns arise—the title adopted being given in italics.

“Initial” Cost Allocation—	
Materials, Disbursements, Wages (Prime Costs and Works Expenses).	
<i>Works Cost Allocation Abstract</i> (Grouped Production Orders and Standing Orders).	F 162.
Works Expenses.—Apportionment.	
<i>Works Expenses Apportionment Report—Departments.</i>	F 135.
“ ” ” ” —Sub-Departments.	F 136.
Production Oncosts—Distribution.	
<i>Works Cost Allocation Abstract</i> (Grouped Orders).	F 162.
Process and Finished Stock Product—Valuation.	
<i>Works Product Abstract</i> (Production Accounts).	F 161.
“Final” Cost Allocation—Works Product as “Materials.”	
<i>Works Cost Allocation Abstract</i> (Grouped Orders).	F 162.
• Individual Production Order Costs (Cost Ledger).	
<i>Delivered Orders Cost Abstract.</i>	F 138.
Individual Plant Order Costs (Cost Ledger).	
<i>Plant Orders Cost Summary.</i>	F 137.
Stock Adjustments, etc. (Production Oncosts Book).	
<i>Works Accounts Annual Abstract.</i>	F 163.

Other types of cost returns are represented by the following forms :

Estimate and cost comparison sheet.	F 10.
Wages allocation weekly summary.	F 30.
Component cost comparison card.	F 63.
Rough component rate card.	F 127.
Finished component rate card.	F 128.

Nature of
Cost Returns.
p. 36.
p. 441.
p. 530.

This does not of course cover the whole ground, the more so as different trades require different forms of cost returns.

The commercial use of cost returns must depend mainly on the character of the business. One form of return is the delivered orders costs abstract mentioned above. This leaves out of question commercial oncosts on the assumption that these are usually applied as a flat percentage on total production costs, though the utmost discrimination feasible in that respect is recommended. Assuming the flat percentage is used, investigation of trading margin, before applying commercial oncosts, will be as useful as dealing with net profit, besides making the return less highly confidential. Cost returns by classes of orders corresponding to the grouping of sales returns will be usually very serviceable, apart from consideration of individual orders. In the illustration provision is made for setting out the preparation costs (drawings, etc.) and the exceptional costs (errors and defects). This information will often elucidate losses without further enquiry. A more searching form of return is shewn as an estimate and cost comparison sheet, wherein the sectional costs are set in parallel with the sectional estimate.

It should hardly be necessary to emphasise the risks attaching to satisfaction with the general blend of business without tracing the sources of abnormal profits and hidden losses, the latter being almost inevitable where there is any variety in classes of product.

The administrative use of cost returns takes mainly two directions, first, the checking of costs with estimates as the work progresses, to guard against losses; and second, the control of oncosts and furthering of production efficiency by departmental statistics. The information that the works accounts office can supply will depend for its value on means of comparison with output. Some classes of output can be appraised without technical assistance, but collaboration with the production estimator will be necessary in others.

In preparing departmental statistics of oncosts, their form may be much condensed, without much lessened usefulness, by adopting groups of oncosts called services (see page 536). Such summarised information lends itself the more to graphic charts.

When the training of the manager has covered the principles of accounting, he will be able to get more advantage from the costing system without necessarily incurring more expense. He will then know in what form and through what channels to secure the information he needs and to criticise the returns he does get.

Cost returns in conjunction with selling prices will more and more have to be brought under discussion when alteration of wages rates are being considered. Nature of
Cost Returns

Some Joint Industrial Councils have already moved in the consideration of average costs, and it is very desirable that the technical management should have the closest possible knowledge of how the costs are built up by the accountant.

Reverting to the diagram on page 444, the reference to the manufacturing ledger in the financial accounting system, requires some explanation here to help focus the problem of interlocking of the cost accounts with the financial accounts—which is essentially the financial purpose that cost returns have to meet. Without such interlocking there can be no reliability as to the completeness of the cost allocation, and the same might be said as to accuracy, though a mere bookkeeping accuracy is no guarantee of actual accuracy. Some costing systems satisfy the accountant in this way, without satisfying the requirements of those who understand the liability of erroneous time and material booking being hidden under arithmetical exactness as to the grand total. Interlocking
of Cost
Accounts with
Financial
Accounts.
p. 19.
p. 451.

The financial accounts cover all financial operations in the course of manufacture and trade. The final profit and loss account is derived therefrom.

The problem of interlocking of cost and financial accounts is simple enough so long as there is a clear dividing line between the two systems.

This is accomplished by refraining from any attempt to do part of the cost accounting in the financial books on some specious argument as to its confidential nature. The works accountant ought to be as trustworthy as any other accountant, and should have status accordingly, for his scope of usefulness to the management as a confidential assistant can be far-reaching.

The procedure, therefore, is to open suspense accounts in the "financial" manufacturing ledger for the entire works expenditure under the heads

Works Materials Suspense Account.

Works Disbursement Suspense Account.

Works Wages Suspense Account.

The whole of the works expenditure, that is, expenditure on behalf of the works, is in the first instance debited to one or other of these three suspense accounts in the financial books. The cost accounting system has to account for this expenditure in its entirety, and to enable the cost accounting system to be

**Interlocking
of Cost
Accounts with
Financial
Accounts.**

controlled in the accountancy sense, without reference to the financial accounts, a works account register is kept, wherein all items of works expenditure, as incurred, are entered. Specimen rulings, with notes, are given, from which the functions of the works account register will be more fully understood.

The register resolves itself into five main divisions :

Purchases.

Disbursements.

Wages.

Works products.

Purchase credits.

The rulings referred to bring the five sections on three separate sheets.

The use of the works account register is further discussed on pages 442 and 452.

The suspense accounts in the financial books are only credited on the strength of suitable evidence or returns from the works accounts office. Expenditure not allocated or not accounted for, that is, the outstanding balance on these suspense accounts—the difference, in fact, between the total debits and the total credits—remains, therefore, metaphorically, a liability of the works administration.

The medium by which the results of the cost accounts system are applied to the financial accounts system is firstly the works cost allocation abstract, on which return is made periodically, say, fortnightly, of the allocation under the following heads—as embodied

F 162, in the specimen form.

Order Series	-	-	-	A—Sales (Despatch or Special Production) Orders.
				B—Sales Repair and Sundries (Despatch or Special Pro- duction) Orders.
				C—Stock Production Orders.
				D—Experimental Orders.
Departmental Process Accounts				G—Iron Foundry.
				H—Brass Foundry.
				K—Smithy.
Works Additions	-	-	N	} under Standing Order Nos.
Works Repair Expenses	-	-	R	
Works General Expenses	-	-	S	
Works Sundry Accounts	-	-	U	

This return shows, amongst other items, the allocation of the expenditure to the various works expense accounts or standing orders, and also incorporates the distribution of works expenses as production oncosts.

The accounts required in the manufacturing ledger are as follows :		Interlocking of Cost Accounts with Financial Accounts. F 162.
<i>Works Expenses Allocation Accounts</i>	Separate accounts corresponding with standing orders—Series R and S (derived from works cost allocation abstract).	
<i>Works Expenses Distribution Account</i>	The total allocations in the above accounts are transferred to this account as a debit and the distributions reported under Production Oncosts on the works cost allocation abstracts are credited. Should any difference appear in this account at the end of the year, it is cleared by a supplementary distribution of works expenses, through the works accounts annual abstract.	F 162. F 163.
<i>Depreciation Account</i>	Incorporating amounts reported in works account annual abstracts as having been included in production oncosts—these amounts are transferred to the <i>works expenses distribution account</i> .	p. 557. p. 558. p. 559. p. 560. p. 562. p. 572. p. 573.
<i>Interest on Works Capital Account</i>		
<i>Guarantee Liabilities Account</i>		
* <i>Development and Experimental Account</i>		
* <i>Loose Plant, etc., Stock Accounts (Annual Loss)</i>		
* <i>Works Materials, Stock Account (Annual Loss)</i>		
<i>Process Accounts</i>	Separate accounts for each process e.g., Iron Foundry, Brass Foundry, Smithy, works costs debited and output credited according to works product abstract.	p. 499. p. 561. F 161.
<i>Stock Production Account</i>	Debited with works costs of all stock production orders, and credited with output at works value.	p. 519. F 161.
<i>Sales Order Account</i>	Debited with works cost of all sales production and despatch orders, and credited with sales invoice totals.	F 162.
<i>Sales Repairs and Sundries Order Account</i>	Debited with works cost of all sales repairs and sundries production and despatch orders, and credited with sales invoice totals.	F 162.
See next page.		

Interlocking
of Cost
Accounts with
Financial
Accounts.

F 162.

Development and Experimental Order Costs

Debited with works costs of all development and experimental orders; credited with anticipated expenditure provided for in production oncosts (pp. 557 and 562), and expenditure carried forward.

p. 493. *Scrap Account*

F 161

Credited with scrap values not credited to production orders.

p. 384. *Works Material Stock*
p. 573. *Account*

F 163. *Loose Plant, etc., Stock*
Accounts

Accounts for adjustment of stock figures at end of year. Anticipated annual losses provided for in production oncosts (pp. 556-7) are transferred to *Works Expenses Distribution Account*, see previous page.

Works Profit and Loss

F 164

Account

The balances of the above accounts are aggregated here, and the resulting balance—the *trading margin* (p. 532)—is in turn transferred to the final profit and loss account.

Capital expenditure accounts are kept in the "financial" *private ledger* as distinct from the "financial" *manufacturing ledger*, as a matter of financial accounting convenience.

It may seem that as the financial accounts as to works expenditure are built up almost entirely from cost returns, the manufacturing ledger and private ledger make unnecessary a separate cost ledger in the works accounts office or vice versa. The accounts in the financial books are, however, very much more condensed than in the cost ledger as considered on pages 576, *et seq.*, and while F 132. the manufacturing ledger and private ledger together meet the general financial requirements for building up trading or profit and loss accounts, they do not give the dissection necessary for works administration purposes. Such duplication or overlapping that may seem to exist is justified on the two grounds of (1) independence of each set of accounts—cost and financial; (2) the summarising effected by the manufacturing ledger involves practically no more work than if the cost ledger were developed to provide the condensed information required for the financial accounts, so that actually the convenience of separate sets of accounts does not involve extra expense.

Works
Product
Abstract.

The works material suspense account, referred to on page 567, includes such items as process and finished stock product, which

after manufacture pass into stock to be dealt with as materials. To keep the works accounting straight the works value or cost of these stock additions are duly credited through the medium of works product abstracts to the appropriate account in the manufacturing ledger, and then re-debited at that total cost, or approximately so, as additional materials. This is an accountancy operation of primary importance if there is to be satisfactory interlocking of the two accounting systems. It has the effect of recharging the works with stock product, which must be accounted for either by final allocation to a sales (despatch) order, or by inclusion in the annual return of stock.

**Works
Product
Abstract.**

p. 515.
p. 519.
p. 578.

In the specimen works product abstract the items provided F 161. for are :

- | | | | |
|--|-------|---|---------|
| 1. Process Product | - | <i>Process Account, Iron Foundry.</i> | p. 515. |
| 2. " " | - | <i>Process Account, Brass Foundry.</i> | |
| 3. " " | - | <i>Process Account, Smithy.</i> | |
| 4. Finished Stock | - | <i>Stock Production Account.</i> | |
| 5. Returns from Customers | - - - | <i>Sales Order Account.</i> | p. 492. |
| 6. Returns from Customers | - - - | <i>Sales Repairs, and Sundries Order Account.</i> | p. 560. |
| 7. Scrap not credited to cost of order | - - | <i>Scrap Account.</i> | p. 493. |
| 8. Scrap credited to cost of order | - - | <i>Works Materials Suspense Account.</i> | |

The items themselves are credited to the respective accounts, indicated alongside in italics, in the manufacturing ledger. The total works value as reported under the various heads is debited to *works materials suspense account* in the same ledger.

The works account annual abstract, already mentioned as a form of cost return, is prepared at the end of each year after the stock-taking has been completed. Some of the items can only be arrived at by conference of the responsible members of the management with the managing director and possibly the directors, and, in the following list, this condition is indicated as "settled by conference."

**Works
Accounts
Annual
Abstract.**

A specimen abstract is given in Section VII c and the items F 163. indicated therein can be with advantage further explained here.

1. Stock Value of Work in Progress.

Sales (Despatch or Special Production) Orders (Series A).

Sales Repairs and Sundries (Despatch or Special Production) Orders (Series B).

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Annual
Abstract.**

Stock Production Orders (Series C).
Iron Foundry Account (Series G).
Brass Foundry Account (Series H).
Smithy Account (Series K).

p. 398.

These values will be derived from the cost ledger balances after careful adjustment in accordance with the results of the work in progress inventory.

While it is better that no profits should be assumed as earned until an order is actually completed, and preferably despatched, yet on large contracts it may not be practicable to wait; in that case the test of work in progress values must be as to whether the further expenditure estimated with care, as necessary, will keep the total completed costs within the selling price sufficiently to give a profit. This precaution is desirable on all unfinished orders in an advanced state at the year end, and any consequent writing down of work in progress should be shown on this abstract.

p. 36.
p. 562.

A reserve must be made to cover the estimated unmatured guarantee liabilities on the product of the year (see p. 574).

2. Values to be carried forward.

"Settled by conference."

Experimental Orders (Series D).
Drawings and Patterns
Jigs, Special Tools and Gauges.

p. 471.
p. 523.
p. 539.
p. 557.

The consideration of what value, if any, shall be carried forward in respect to expenditure on developments and experiments is partly a matter of finance, as distinct from costing, though the works manager may be competent to make a recommendation as to concrete values. The abstract should embody an agreed decision so that the writing off, arising out of the lack of justification for carrying forward the full book value, will be included in the production oncosts for the year as to the estimated amount provided for and the balance treated as a charge against works profit and loss.

F 164.

p. 492.

It would be easily possible for the cost of some experiment to be more deservedly chargeable to commercial expenses than to works expenses, which would mean its inclusion as a charge against the final profit and loss account instead of the works profit and loss account.

The valuation of drawings, patterns, jigs, special tools and gauges is considered on pages 400 and 467.

3. Stock Values.

- | | |
|----------------------|----------------------------------|
| a. General Stock. | d. Loose Plant. |
| b. Component Stock. | e. Office Equipment. |
| c. Complete Product. | f. Discarded Plant Scrap Values. |

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Abstract.

These are a matter of inventory in conjunction with the stock account balances. The inventory, as regards items *a*, *b* and *c*, should distinguish between standard or good stock, and non-standard, or doubtful and bad stock, and the distinction must be made before the works submit the net inventory values. The amount to be written off should be settled by conference. Similarly as to any reservation to meet a possible fall in market values. Interest charges included in finished components stock rates must not be carried forward, see p. 575.

p. 373.
p. 379.
p. 380.
p. 384.
p. 391.
p. 394.
p. 395.
p. 396.
p. 397.
p. 498.
p. 539.
p. 560.

Distinction must be made in the case of loose plant and similar classes of stock (p. 556-7) between the anticipated loss provided for in the production oncosts and the balance remaining to be charged against works profit and loss (p. 570). F 164.

Discarded plant scrap values represent the value of discarded plant not disposed of at the time of stocktaking. This matter is discussed further on page 411. Obviously only realisable prices must be used and the existence of the items valued must be verified, the more so as no strict account is likely to be feasible of the consumption of discarded plant during the year for repair purposes, etc.

4. Process Account Differences.

The balances on the respective departmental process summary accounts are reported here, although the process accounts built up in the financial books should give the same result.

p. 561.
p. 569.

5. Stock Production Account Differences.

The balances on the respective stock production accounts are aggregated in the production oncosts book and the net result reported here. The parallel account in the financial books should agree.

p. 562.
p. 569.

6. Depreciation.

Settled by conference at the end of each year as to the flat rates of depreciation to be used for each group, viz.:

- | | |
|-----------------------------|---------------------------|
| 1. Land and Buildings. | 6. Transportation Plant. |
| 2. Motive Power Plant. | 7. Shop Fixtures. |
| 3. Mechanical Transmission. | 8. Special Process Plant. |
| 4. Electrical Transmission. | 9. Machines. |
| 5. Pipe Transmission. | |

p. 416.

The rates so settled are used throughout the year for production oncost purposes and the total depreciation for

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Abstract.
p. 411.
p. 416.

the year thus provided for is reported here for incorporation accordingly in the financial accounts.

A supplementary amount for depreciation is included in respect to extra depreciation on individual items of discarded plant, which when discarded stood in the books at a higher value than the value realised by their sale. This extra depreciation meets the question of obsolescence as it arises.

The yearly totals of both the annual depreciation and the extra depreciation are derived from the production oncosts book.

The works manager should be responsible for the sufficiency of the depreciation reported in this way, and if the works have been running excessive hours, it will be for him to make recommendations as to a further general depreciation on these grounds.

p. 557.
p. 558.

p. 417.

p. 495.
p. 563.

7. Advance Expenditure.

This item has reference to any expenditure that has been incurred on behalf of a period not fully expired at the end of the year, such as rates and insurance premiums. Full details are necessary in this abstract.

8. Liability Reserve.

This item deals with the reverse conditions to those indicated for item No. 5. In this case, liabilities in respect to the current year for which no invoice or charge has been presented must be enumerated. A typical case, if the firm do not insure against accident compensation risks, will be the outstanding liabilities in respect to accident cases that have not been settled. Full details, not merely totals, are necessary in the abstract.

The reservation in respect to estimated guarantee liabilities, as provided for in production oncosts (p. 557), must be reported separately.

p. 495.
p. 539.
p. 557.
p. 563.

p. 35.
p. 662.

9. Wages Reserve.

In this instance the character of the reserve is to provide for wages allocated in the current year's accounts, but not included in the cash expenditure for that period. The occasion for this reserve will arise when the end of the year precedes by a day or two the end of a pay week.

p. 563.

10. Works Expenses (Production Oncosts) Supplementary Distribution.

There will inevitably be some difference either of under-distribution or over-distribution of works expenses in the

application of production oncosts during the course of the year, and what this amounts to will be evident from the production oncosts book.

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Abstract.

p. 563.
p. 569.

It is desirable to apportion whatever difference there may be to the respective classes of orders to which it applies, viz. sales, sales repairs and sundries, stock production orders, and process accounts. The basis of apportionment may very well be as a common percentage of the production oncosts totals as already applied during the year in the ordinary way. This adjustment must serve to dispose of the whole of the works expenses as they appear in the financial books.

11. Interest on Works Capital.

The question of including interest on capital employed in the works as an item of production oncosts is referred to on pages 554 and 559 and, if included, the account for the year as recorded in the production oncosts book must be reported in this abstract for inclusion in the financial account. This step is necessary, as in the case of depreciation, in view of the fact that amounts of this character included in production oncosts are best determined from the works account books rather than that this should be laid down in the financial books as a precise item of works expenditure.

The amount included as interest must be duly reported subject to deduction as to any interest factor included in the cost of stock assets at the year end, although the stock could not have been produced without the use of capital and the consequent liability for its hire. Inasmuch, however, as the payment of interest is contingent on profit, and in that sense a distribution of profit, to include any interest element in the stock values carried forward would be deceptive, seeing that the goods have not been sold within the year and, therefore, no opportunity afforded of reaping the profit wherewith to pay the interest. Conversely it would not be reasonable to accumulate interest charges on old stock.

12. Cost Allocation Differences.

With information on these lines, the manufacturing ledger in the financial accounts can be intelligently closed and balanced, thus securing absolute interlocking of the cost accounts with the financial accounts.

p. 496.
p. 567.

While it may seem a reflection on the works accounting system if any allocation errors are undiscovered, yet it may

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Abstract.**

not always pay to run to earth very minor clerical errors. With any extensive system of sub-accounts the room for mistakes is sufficiently great for it to be found that some over- or under-allocation has occurred, through error of one kind or other, in a given fortnight. In the system advocated the checks arranged should reduce to a negligible minimum the differences between expenditure and allocation, but should any differences be passed, their amount should be reported on the abstract as materials, disbursements or wages, so as to balance the respective suspense accounts in the manufacturing ledger. The net amount involved should be included in the works expenses supplementary distribution (item 10 above). A memorandum account in the production oncosts book is necessary for this purpose.

Cost Ledger.
p. 451.
p. 570.

Reference has already been made to the cost ledger earlier in this section.

The term cost ledger is in practically universal use as the completing stage of cost accounts, but its functions necessarily vary according to the development of the earlier stages. Quite frequently all the material is detailed in the cost ledger, while the wages are only posted in periodical totals.

The lines followed by the general system of cost accounting advocated place no restraint on the number of sub-sections of costs in the cost allocation accounts, but as a corollary the cost ledger becomes concerned only with the section totals instead of the actual detail items.

This procedure is sound in that it clears the way for refinements in the matter of sub-dividing the cost allocation, and allows those refinements to be applied to any degree or to any order or class of order without elaborating the routine in connection with the cost ledger.

As to the argument that to deal with the whole of the cost accounts in the two stages of cost allocation accounts and cost summaries is to increase the number of sheets to be used and so to complicate the system of accounting, it must be borne in mind that facilities for agreeing the detail entries may be more important than to aggregate every detail at one point. The preceding discussion will have indicated the usefulness of the cost allocation stage in agreeing the accuracy of the figures each fortnight instead of letting the task accumulate by deferring it, with the consequent risk meantime of serious book-keeping errors being unobserved until after some important use has been made of the figures.

Further, from the administrative and commercial point of view the extended use of sub-sections in the cost allocation accounts proportionately enhances their value, but to keep the total for each sub-section distinct in the cost ledger would add greatly to the book-keeping, beside complicating the form of the accounts. The alternative of carrying forward totals on each cost allocation sheet for the respective sub-sections tends to endanger their usefulness for the purposes of periodical or fortnightly agreement or verification.

Cost Ledger.
F 129, 130, 131.

The recommendation that is made is a compromise. Sub-section cost allocation accounts will be totalled each fortnight and those totals summarised under a main account in the cost ledger. Consequently, to arrive at the total cost of a particular sub-section, the fortnightly figures must be abstracted specially from the cost allocation accounts and their completeness verified by checking with the sub-section entries in the cost ledger. As an alternative, if much detail is not required, the sub-section entries may be extracted from the sectional accounts in the cost ledger.

p. 464.
p. 467.

This compromise is justified in that it obviates delay in preparing the cost ledger accounts. Further, it is quite unlikely that every sub-section cost will be consulted, as such, for estimating or any other purpose, and all ordinary requirements are met by having the data accessible whenever it may be required. This is, of course, altogether better practice than depending on the dissection of sub-section costs from a great mass of detail.

A ruling for the cost ledger is given in Section VII c with notes as to routine which should be read in the present connection. It will be noted that the cost ledger provides for cost transfers to be entered separately from cost allocations. Provision is also made for noting the application of cost ledger items to the following purposes :

p. 581.

F 16a.

Works Cost Allocation Abstract.—More particularly applicable for standing order accounts, where it may be safer to first summarise in the cost ledger the cost allocation under the sub-accounts, such as individual plant orders, tool orders, etc., instead of taking the divisional totals (materials, wages, etc.) direct by mechanical means, as can be done with such advantage in other series of cost allocation accounts. The point is that all possible means of speeding up the preparation of the fortnightly works cost allocation abstracts must be utilised to meet the financial accounting requirements on the one hand and to verify or agree that the current works expenditure has been completely, and, as to totals, accurately allocated.

p. 447.

- Cost Ledger,**
 p. 555. F 134. *Production Oncosts Book.*—Memorandum entries of works expense totals are made from the cost ledger.
- p. 572. *Works value of deliveries.*—Entry is made in the cost ledger of part deliveries, and, in conjunction with costs to date, the book value of *work-in-progress* under each production order is made apparent—a matter of vital importance for interim and annual profit and loss accounts.
- F 164. *Delivered Orders Cost Abstract.*—This return is built up from the individual accounts in the cost ledger as each order is completed.
- F 138. *Works Product Abstract.*—In the case of deliveries under stock production orders their works value has to be embodied in the works account register as additional stock material, and periodically reported on works product abstracts, for financial accounting purposes, for recharge as works materials (*works materials suspense account*). Any balance or difference between the works value of such product and the total works costs is noted in the cost ledger and duly embodied in the production oncost book under the stock production differences account. The grand total of these differences is duly reported in the works accounts annual abstract and should tally with the balance in the financial books (manufacturing ledger) of the *stock production account*, whence it passes as a debit or credit item to the *works profit and loss account*.
- p. 523. F 161.
 p. 562.
 p. 509.
 p. 571.
- F 163.
- F 164.
- p. 561.

The procedure for process product follows closely similar lines, except that the departmental process summary accounts, kept either in separate books or in the production oncost book, takes the place of the cost ledger as to embodying the total value of deliveries, and consequently the total cost also, instead of merely the difference between costs and value of product.

The routine of balancing the cost ledger is recapitulated on opposite page.

The method advocated for verifying or agreeing the cost ledger is to agree the balances in accordance with usual accountancy practice. To follow this plan means using inclusive totals instead of the separate totals of materials, disbursements, wages and production oncosts. The keeping of the cost ledger should be, unquestionably, in responsible hands.

In this connection mechanical means of abstracting and totalling can be applied with great advantage.

BALANCING OF COST LEDGER.		Cost Ledger.
Sales Orders, - - Series A.	} Balanced by posting to delivered orders cost abstract.	F 138.
Sales Repairs and Sundries Orders, - - „ B.		
Stock Production Orders, - - - „ C.	Balanced by entries on stock product summary sheet and posting of differences to production oncosts book.†	F 119.
Experimental Orders, „ D.	Balanced by posting to delivered orders cost abstract.	F 138.
Process Accounts, Series G. H. K.	Balanced by entries of output on process product summary sheets. Memorandum entries also made in production oncosts book.†	F 118.
Works Capital Additions, - - - Series N.	Balanced by posting to a plant orders cost summary each fortnight. After the necessary cost transfers have been made the resulting totals are entered on a works cost allocation abstract* and also in the production oncosts book.†	F 137.
Works Repair Expenses, „ R.	Balanced by posting to works cost allocation abstract.* A memorandum record also posted to production oncosts book.†	
Works General Expenses, - - - „ S.	Balanced by posting to works cost allocation abstract.* A memorandum record also posted to production oncosts book.†	
Works Sundry Accounts, „ U	Balanced by posting to works cost allocation abstract.* A memorandum record of certain items being also kept in production oncosts book.†	

* Form F 162.

† Form F 134.

Cost Ledger. As previously stated, the cost ledger balances should represent the value of the work-in-progress, but an independent work-in-progress report is necessary for financial account purposes. This F 142. is incorporated in the works account annual abstract, which has to give certified details. Subject to proper scrutiny by the works accounts office, the fortnightly cost ledger balances are very service- F 161. able for financial purposes and particularly at the half year when preparing an approximate profit and loss account.

Cost Transfers. For various reasons transfers of costs may be necessary, and the following are typical cases :

- p. 150. When items of work in progress are transferred from the original order to some more urgent order.
- p. 12. When two or more sales orders are coupled for manufacturing convenience and the costs have afterwards to be split up.
- p. 469. When adjustments are necessary on account of errors and defects.
- p. 400. When the cost of drawings, patterns, jigs and special tools is deemed to be in part, or wholly, chargeable to works capital additions.
- p. 467. When it is elected to charge a repeat order with some part of the cost of drawings, patterns, jigs and special tools that have been previously transferred to works capital additions from the original production order.
- p. 469. When abnormal expenditure on a sales or stock production order is considered as chargeable to developments and experiments.
- p. 463. When work additions are of an experimental nature and part, or all the cost, is considered chargeable to developments and experiments.
- p. 497. When costs under works additions are found to require adjustment before being entered in the financial books.
- p. 495. When it is desired to equalise expense expenditure that has reference to a longer period over the fortnightly account periods of expenditure, *e.g.* insurance premiums.
- When it is necessary to anticipate expenditure to equalise the fortnightly expense accounts, *e.g.* rent.
- p. 305. When the cost of auxiliary services, such as secondary labour, departmental sundries, and special tool maintenance have been allocated excessively to a production order. Similarly with overtime expenses.
- p. 376.
- p. 466.
- p. 469.

It is obviously desirable to exclude these transfers from the cost allocation accounts, particularly so as to avoid being compelled to split up the transferred costs under the cost allocation sub-

sections. It will, therefore, be convenient to incorporate the transfers in the cost ledger, where sufficient detail must be given to explain the occasion of the transfer. It will be necessary to show the proportions pertaining to materials, disbursements, wages and production oncosts under those divisions, for it is only in that form the adjustment can be accepted in the financial accounts.

While it is possible to make these transfers in the cost ledger, without providing any other record, it is much more convenient and safer accounting practice to first record the items in a cost transfer journal and to post to the cost ledger from that source. F 133.

In the case of errors and defects, entries will be considerably minimised by allowing the viewing reports to accumulate for the fortnight and to aggregate the items for each order concerned in the cost transfer journal—posting totals only to the cost ledger. F 98.

WORKS ROUTINE

VII

SPECIMEN FORMS

SECTION	PAGE
VII A—Introduction - - - - -	585
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VII C—Illustrations of Specimen Forms with Routine Notes and Cross-Reference Tables - - - - -	597

VII A

SPECIMEN FORMS—INTRODUCTION

THE specimen forms illustrated in this section derive their possibility of usefulness, as explained in the Preface, not so much from their precise design or inter-relationship one to the other, but as providing a consensus of the factors operating in a given case. The routine notes given alongside each form go to supplement the reminder or suggestion conveyed by the form itself.

It is important that their educational value should not be hampered by prejudice that the author is making specific recommendation for universal application under all conditions. The very profusion of the specimen forms illustrated makes it less likely that such a view will obtain with many managers, but it is not always easy for practical men to view illustrations of this kind as typical, the tendency being to view them as the dogmatic laying down of hard and fast rules, which is not the intention here.

Economy of administration is not to be measured by the fewness of the printed forms used or its efficiency by their number.

Multiplicity of forms used for administrative purposes may be necessary to obtain and maintain a continuous standard of efficiency, reflecting itself in maximum production at minimum cost, or it may be the sign of despairing management clutching at straws, in the guise of systems, when the great defect is not want of system, but want of policy.

The settlement of a manufacturing policy must precede all organisation, and the adoption of ready-made systems, with furniture to match, is, to say the least, putting the cart before the horse.

There are managers who have an entirely wrong conception of organisation as being the end instead of the means only. The end is administration, finding expression in equity and efficiency in all directions.

The choice and proper use of organisation and routine forms, very much as with machines and tools used in manufacturing processes, necessitate administrative skill. The whole work is devoted.

therefore, to dissecting the various factors in administration, so that the exercise of native judgment shall be made easier, and a greater willingness shown to see administration steadily, and to see it whole. The specimen forms can be utilised to great advantage as visualising various aspects of a given problem or steps in its solution.

Hundreds of marginal references have been made in the body of the book to the specimen forms, under the Form Nos. as F. 1, F. 2, and then, on the page facing the respective specimens, is given a cross-reference to all those pages where the form in question has been indicated as having some interest or application. In addition, on these cross-reference pages, a summary has been given of other specimen forms which are likely to be of interest in each case.

The forms are arranged so as to be read in the ordinary horizontal way, and are printed on right hand pages, so as to allow ready reference from any other point in the book.

This is done to help the reader to review as many aspects as may be necessary before he reaches his conclusions as to what will meet his particular case. The conditions under which most practical men have to make their decisions are not favourable to deliberation and careful weighing of pros and cons. They would like, of course, a solution of every problem ready instantaneously to their hand, but this is obviously unattainable under the infinite variety of conditions that obtain in industry; the next best thing seems to be to provide a guide to a rapid all-round survey of the principles likely to be involved—hence these cross-references—and then for the reader to make his own decisions with some confidence that his judgment will properly meet his present needs without cutting across either present practice or future requirements.

A little divergence will be found between some of the terms used in the specimen forms and those used in the body of the book. The former, being the embodiment of actual practice, retain their original terms, although not drawn to scale, but the author has taken advantage in rewriting the whole book, to depart in a few instances from his previous practice in this respect. The following instances practically cover the ground:

For *Shop Charges* read *Production Oncosts*.

For *Stock Manufacturing Order* read *Stock Production Order*.

For *Time Limit* read *Job Rate*.

For *General Manager* read *Managing Director*.

So far as titles of forms are concerned, alternative titles are given on the cross-reference pages in a few cases, and, more generally, in the alphabetical index of form titles, so that the reader can probably

find any form he is seeking by looking under the word or term that he himself uses.

There is a good deal to be said for the standardisation of terms applicable to factory administration, and the efforts of the author in this direction will be observed throughout the book and again in the glossary and index.

The formulation of principles is, however, of still greater import, and it is not advisable to press the standardisation of terms too insistently, lest it seem to be begging the question as to principles.

•

VII B

DEPARTMENTAL APPLICATION OF SPECIMEN FORMS

IN the following schedules, the specimen forms, which are illustrated in the next section, are grouped under the headings of officials and departments likely to be interested, directly or indirectly, in the respective forms. It is not contended that the grouping will exactly meet the necessities of every case, or, for that matter, of any given case, but it will serve to indicate to the reader some of the information at his disposal, from the point of view of his own position in industry.

The interests of the managing director are so widespread that he might reasonably claim to be interested in all the forms, and, therefore, the grouping of the forms, according to the officials and departments under his direction, taken as a whole, is also the most useful way in which they can be presented for his use.

The reason for not specifically referring to the general manager is made clear on page 22 in discussing the staff diagram given as a frontispiece. The present grouping of the forms follows this diagram and, while the forms noted under the particular headings, do not necessarily cover the full activities of the official or department in question, yet the tabulation will serve to throw some light on their possible functions, and tend to widen the outlook of the reader in relation to his colleagues and departments other than his own.

* In pursuing this plan of tabulation, the same form references will be found, in a number of cases, to appear under several headings, but the title and character of the form will make sufficiently clear the department more directly responsible for the forms. The routine notes against each specimen form make this point still clearer.

FINANCIAL MANAGEMENT.**Secretary.**

- F. 10—Estimate and Cost Comparison Sheet.
- F. 11—Tender.
- F. 12—Office Order—Production.
- F. 49—Production Instruction.
- F. 57—Application for Stock Production Sanction.
- F. 137—Plant Orders Cost Summary.
- F. 138—Delivered Orders Cost Abstract.
- F. 140—Stock Inventory Sheet
- F. 142—Work-in-Progress Inventory Sheet.
- F. 145—Buildings and Fixed Plant Register.
- F. 164—Works Profit and Loss Account.

Staff Records.

- F. 1—Staff Application Form.
- F. 2—Staff Attendance Book.
- F. 3—Staff Weekly Report

Correspondence Department.

- F. 4—Correspondence Endorsement Stamp.
- F. 5—Correspondence Register
- F. 6—Correspondence Index Card

Financial Accountant.

- F. 84—Returnable Package Card
- F. 112—Packing Slip
- F. 113—Advice of Despatch
- F. 122—Suppliers' Package Record
- F. 161—Works Product Abstract.
- F. 162—Works Cost Allocation Abstract.
- F. 163—Works Account Annual Abstract.
- F. 165—Credit Claim Note.

Cashier.

- F. 32—Wages Abstract.
- F. 34—Unclaimed Pay Report.
- F. 35—Special Pay Ticket
- F. 36—Away Expenses Sheet.
- F. 37—Away Time Sheet.
- F. 38—Accident Report.
- F. 120—Cash Report to Works.

SALES MANAGEMENT.**Sales Manager.**

- F. 7—Illustrations Register.
- F. 8—Sales Promotion Index Card
- F. 9—Estimate Detail Sheet
- F. 10—Estimate and Cost Comparison Sheet.
- F. 11—Tender.
- F. 12—Office Order—Sales.
- F. 13—Acknowledgment of Sales Order.
- F. 43—Product Complaints Report.
- F. 112—Packing Slip.
- F. 113—Advice of Despatch.
- F. 138—Delivered Orders Cost Abstract.

PRODUCTION MANAGEMENT.**General Works Manager.**

- F. 1—Staff Application Form.
- F. 2—Staff Attendance Book.
- F. 3—Staff Weekly Report.
- F. 10—Estimate and Cost Comparison Sheet.
- F. 12—Office Order—Sales.
- F. 12—Office Order—Production.
- F. 43—Product Complaints Report.

PRODUCTION MANAGEMENT—(Continued).

- General Works Manager.** (Continued.)
- F. 49—Production Instruction.
 - F. 52—Individual Order Progress Chart.
 - F. 54—Purchase Requisition.
 - F. 57—Application for Stock Production Sanction.
 - F. 58—Operation and Tools Provided Schedule.
 - F. 60—Estimate for Job Rate.
 - F. 62—Job Investigation Report.
 - F. 63—Component Cost Comparison Card.
 - F. 64—Plant Record Card.
 - F. 65—Plant Efficiency Report.
 - F. 93—Summary of Tools Broken or Lost.
 - F. 105—Component Weekly Shortage List.
 - F. 108—Works Product Note
 - F. 137—Plant Orders Cost Summary
 - F. 138—Delivered Orders Cost Abstract.
 - F. 145—Buildings and Fixed Plant Register.
 - F. 146—Labour Notification.
 - F. 150—Lost Time Summary.
 - F. 159—Foreman's Requisition.

Buyer.

PURCHASING DEPARTMENT.

- F. 14—Price Enquiry.
- F. 15—Purchase Order.
- F. 39—Standard Fittings Sheet.
- F. 54—Purchase Requisition.
- F. 80—Purchase Delivery Reminder Card
- F. 81—Purchase Order Endorsement.
- F. 82—Goods Received Note.
- F. 83—Acknowledgment of Goods Received (Non-Purchase).

Chief Draughtsman.

DRAWING OFFICE.

- F. 9—Estimate Detail Sheet.
- F. 39—Standard Fittings Sheet.
- F. 40—Component Design Comparison Sheet
- F. 41—Component Register
- F. 42—Component History Card.
- F. 43—Product Complaints Report.
- F. 44—Print Index Card.
- F. 45—Print Delivery Ticket.
- F. 46—Print Recall Slip.
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction.
- F. 50—Erecting Specification Card
- F. 51—Sales Sundries Order Specification.
- F. 53—Quantity Slip.
- F. 109—Works Product Finished Weight Card

Production Estimator. WORKS OFFICE (*Production Estimating and Rate-fixing Section*).

- F. 9—Estimate Detail Sheet.
- F. 25—Job Advice.
- F. 26—Job Account Card (Job Rate Notification).
- F. 39—Standard Fittings Sheet.
- F. 40—Component Design Comparison Sheet.
- F. 41—Component Register.
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction.
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.
- F. 58—Operation and Tools Provided Schedule.
- F. 59—Tool Order

PRODUCTION MANAGEMENT—(Continued).**Production Estimator. WORKS OFFICE—(Continued).**
(Continued.)

- F. 60—Estimate for Job Rate.
- F. 61—Job Record Sheet.
- F. 62—Job Investigation Report.
- F. 63—Component Cost Comparison Card.
- F. 64—Plant Record Card.
- F. 65—Plant Efficiency Report.
- F. 96—Plant Order.
- F. 98—Viewing Report.
- F. 141—Work-in-Progress Slip.
- F. 155—Job Ticket.

Production Regulator. WORKS OFFICE (Production Regulation Section).

- F. 15—Purchase Order.
- F. 25—Job Advice.
- F. 39—Standard Fittings Sheet.
- F. 41—Component Register.
- F. 45—Print Delivery Ticket.
- F. 46—Print Recall Slip.
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction.
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.
- F. 52—Individual Order Progress Chart.
- F. 53—Quantity Slip.
- F. 54—Purchase Requisition.
- F. 55—Stock Appropriation Ticket.
- F. 56—Reserve Stock Control Card.
- F. 57—Application for Stock Production Sanction.
- F. 58—Operation and Tools Provided Schedule.
- F. 59—Tool Order.
- F. 69—Casting Instruction.
- F. 71—Casting Delivery Sheet.
- F. 72—Foundry Waster Ticket.
- F. 77—Forging Delivery Sheet.
- F. 80—Purchase Delivery Reminder Card.
- F. 81—Purchase Order Endorsement.
- F. 82—Goods Received Note.
- F. 83—Acknowledgment of Goods Received (Non-Purchase).
- F. 84—Returnable Package Card.
- F. 94—Completed Tool Advice.
- F. 96—Plant Order.
- F. 97—Operation Progress Ticket.
- F. 98—Viewing Report.
- F. 100—Work Tally or Machining Sub-Order.
- F. 101—Assembling Sub-Order.
- F. 102—Erecting Sub-Order.
- F. 103—Daily List of Machining Sub-Orders Issued.
- F. 104—Work Depot Production Programme.
- F. 105—Component Weekly Shortage List.
- F. 107—Progressive No. Register.
- F. 108—Works Product Note.
- F. 159—Foreman's Requisition.

WORKS DEPOT (Work-in-Progress).

- F. 39—Standard Fittings Sheet.
- F. 41—Component Register.
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction.
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.

PRODUCTION MANAGEMENT—(Continued).**Production Regulator. WORKS DEPOT (Work-in-Progress)—(Continued).**
(Continued.)

- F. 52—Individual Order Progress Chart.
- F. 53—Quantity Slip
- F. 69—Casting Instruction.
- F. 71—Casting Delivery Sheet.
- F. 77—Forging Delivery Sheet.
- F. 97—Operation Progress Ticket.
- F. 100—Work Tally or Machining Sub-Order.
- F. 101—Assembling Sub-Order.
- F. 102—Erecting Sub-Order
- F. 103—Daily List of Machining Sub-Orders Issued
- F. 104—Work Depot Production Programme.
- F. 105—Component Weekly Shortage List.
- F. 107—Progressive No. Register.
- F. 108—Works Product Note
- F. 109—Works Product Finished Weight Card.
- F. 141—Work-in-Progress Slip.

Chief Inspector.**INSPECTION DEPARTMENT (including Viewing).**

- F. 39—Standard Fittings Sheet.
- F. 41—Component Register
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.
- F. 53—Quantity Slip.
- F. 58—Operation and Tools Provided Schedule.
- F. 72—Foundry Waster Ticket
- F. 97—Operation Progress Ticket.
- F. 98—Viewing Report
- F. 99—Inspection Certificate.
- F. 108—Works Product Note.
- F. 112—Packing Slip.
- F. 141—Work-in-Progress Slip.

WAREHOUSE (Completed Saleable Product and Spare Parts).

- F. 12—Office Order—Sales.
- F. 39—Standard Fittings Sheet.
- F. 41—Component Register.
- F. 47—Drawing Summary
- F. 48—Component Assembly List
- F. 49—Production Instruction
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.
- F. 55—Stock Appropriation Ticket.
- F. 56—Reserve Stock Control Card.
- F. 57—Application for Stock Production Sanction.
- F. 99—Inspection Certificate.
- F. 107—Progressive Number Register.
- F. 109—Works Product Finished Weight Card.
- F. 111—Warehouse Daily Report of Despatches from Stock.
- F. 112—Packing Slip.
- F. 113—Advice of Despatch
- F. 114—Outwards Package Tracing Card.
- F. 139—Stocktaking Slip.

Works Medical Referee.

- F. 149—Individual Attendance Chart.
- F. 150—Lost Time Summary.

PRODUCTION MANAGEMENT—(Continued).**Works Medical Referee. CASUALTY STATION.***(Continued.)*

- F. 38—Accident Report.
- F. 153—Casualty Log Book.
- F. 154—Casualty Re-dressing Ticket.

Labour Co-ordination Officer.**WORKS ENQUIRY OFFICE (*including Employment*).**

- F. 16—Workers' Employment Form.
- F. 17—Workers' Reference Form.
- F. 18—Wages Advice.
- F. 20—Discharge Note.
- F. 146—Labour Notification.
- F. 147—Labour Order.

Works Superintendent.**WORKS DEPARTMENTS—General.**

- F. 18—Wages Advice.
- F. 20—Discharge Note.
- F. 23—Overtime Authorisation.
- F. 24—Gate Pass.
- F. 25—Job Advice
- F. 39—Standard Fittings Sheet.
- F. 41—Component Register.
- F. 47—Drawing Summary
- F. 48—Component Assembly List.
- F. 49—Production Instruction
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.
- F. 53—Quantity Slip
- F. 58—Operation and Tools Provided Schedule.
- F. 59—Tool Order.
- F. 90—Print Loan Slip.
- F. 91—Tool Loan Slip
- F. 92—Tool Permanent Loan Record.
- F. 94—Completed Tool Advice.
- F. 90—Plant Order.
- F. 105—Component Weekly Shortage List
- F. 106—Departmental Memorandum.
- F. 146—Labour Notification.
- F. 151—Meal Pass
- F. 152—Leave of Absence Ticket.
- F. 155—Job Ticket
- F. 156—Group Work Card.
- F. 158—Plant Stoppage Report.
- F. 159—Foreman's Requisition
- F. 160—Interdepartmental Delivery Note.

PATTERN SHOP.

- F. 66—Component Pattern Register.
- F. 67—Pattern Tracing Card.
- F. 68—Cross Index Chart.
- F. 69—Casting Instruction.
- F. 70—Pattern Recall Slip.
- F. 88—Timber Ticket.

FOUNDRY.

- F. 69—Casting Instruction.
- F. 70—Pattern Recall Slip.
- F. 71—Casting Delivery Sheet.
- F. 72—Foundry Waster Ticket.
- F. 73—Foundry Daily Work Sheet.
- F. 74—Foundry Mixture Card.
- F. 75—Foundry Stock Control Book.
- F. 76—Foundry Weekly Material Report.

PRODUCTION MANAGEMENT—(Continued).**Works Superintendent. SMITHY.***(Continued.)*

- F. 77—Forging Delivery Sheet.
- F. 78—Smithy Daily Work Sheet.
- F. 79—Smithy Stock Control Book.
- F. 86—Goods Issue Voucher.
- F. 87—Shop Credit Slip.

TOOL STORES.

- F. 21—Tool Clearance Ticket.
- F. 58—Operation and Tools Provided Schedule.
- F. 59—Tool Order.
- F. 90—Print Loan Slip.
- F. 91—Tool Loan Slip.
- F. 92—Tool Permanent Loan Record.
- F. 93—Summary of Tools Broken or Lost.
- F. 94—Completed Tool Advice.
- F. 95—Tool Stores Stock Control Card.
- F. 144—Loose Plant Inventory Sheet.

PLANT DEPARTMENT

- F. 64—Plant Record Card.
- F. 65—Plant Efficiency Report.
- F. 96—Plant Order.
- F. 158—Plant Stoppage Report

GENERAL STORES (Raw Materials and Finished Components).

- F. 15—Purchase Order.
- F. 39—Standard Fittings Sheet.
- F. 41—Component Register.
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction.
- F. 53—Quantity Slip.
- F. 54—Purchase Requisition
- F. 55—Stock Appropriation Ticket
- F. 56—Reserve Stock Control Card.
- F. 57—Application for Stock Production Sanction.
- F. 69—Casting Instruction.
- F. 71—Casting Delivery Sheet.
- F. 77—Forging Delivery Sheet
- F. 80—Purchase Delivery Reminder Card.
- F. 81—Purchase Order Endorsement
- F. 82—Goods Received Note
- F. 83—Acknowledgment of Goods Received (Non-Purchase).
- F. 84—Returnable Package Card.
- F. 85—Stores Tally.
- F. 86—Goods Issue Voucher.
- F. 87—Shop Credit Slip.
- F. 89—Stock Control Card.
- F. 139—Stocktaking Slip.

GATE CONTROL (Works Patrols).

- F. 24—Gate Pass.
- F. 151—Meal Pass.
- F. 152—Leave of Absence Ticket.

Works Accountant.**TIME OFFICE.**

- F. 16—Workers' Employment Form.
- F. 21—Tool Clearance Ticket.
- F. 22—Time Card.
- F. 23—Overtime Authorisation.

PRODUCTION MANAGEMENT—(Continued).**Works Accountant.**
(Continued.)**TIME OFFICE—(Continued).**

- F. 24—Gate Pass.
- F. 38—Accident Report.
- F. 148—Works Discharge Paper.
- F. 149—Individual Attendance Chart.
- F. 150—Lost Time Summary.
- F. 151—Meal Pass.
- F. 152—Leave of Absence Ticket.
- F. 153—Casualty Log Book.
- F. 157—Pay Query Card.

WAGES OFFICE (including Wages Allocation and Production Statistics).

- F. 16—Workers' Employment Form.
- F. 17—Workers' Reference Form.
- F. 18—Wages Advice
- F. 19—Individual Rate and Earnings Record.
- F. 20—Discharge Note
- F. 21—Tool Clearance Ticket.
- F. 22—Time Card.
- F. 23—Overtime Authorisation.
- F. 24—Gate Pass.
- F. 25—Job Advice.
- F. 26—Job Account Card.
- F. 27—Daily Time Slip.
- F. 28—Weekly Time Allocation Sheet
- F. 29—Extra Pay Notification
- F. 30—Wages Allocation Weekly Summary.
- F. 31—Wages Sheet.
- F. 32—Wages Abstract.
- F. 33—Pay Notification.
- F. 34—Unclaimed Pay Report.
- F. 35—Special Pay Ticket.
- F. 36—Away Expenses Sheet.
- F. 37—Away Time Sheet
- F. 97—Operation Progress Ticket.
- F. 148—Works Discharge Paper.
- F. 155—Job Ticket
- F. 156—Group Work Card.
- F. 157—Pay Query Card.
- F. 166—Mechanical Tabulation Ticket.

WORKS ACCOUNTS OFFICE (or Cost Department).

- F. 28—Weekly Time Allocation Sheet.
- F. 30—Wages Allocation Weekly Summary.
- F. 32—Wages Abstract.
- F. 39—Standard Fittings Sheet.
- F. 41—Component Register.
- F. 47—Drawing Summary.
- F. 48—Component Assembly List.
- F. 49—Production Instruction.
- F. 50—Erecting Specification Card.
- F. 51—Sales Sundries Order Specification.
- F. 53—Quantity Slip.
- F. 59—Tool Order.
- F. 60—Casting Instruction.
- F. 71—Casting Delivery Sheet.
- F. 72—Foundry Waster Ticket.
- F. 73—Foundry Daily Work Sheet.
- F. 74—Foundry Mixture Card.
- F. 75—Foundry Stock Control Book.
- F. 76—Foundry Weekly Material Report.
- F. 77—Forging Delivery Sheet.

PRODUCTION MANAGEMENT—(Continued).**Works Accountant.**
(Continued.)**WORKS ACCOUNTS OFFICE—(Continued).**

- F. 78—Smithy Daily Work Sheet.
- F. 79—Smithy Stock Control Book.
- F. 86—Goods Issue Voucher.
- F. 87—Shop Credit Slip.
- F. 88—Timber Ticket
- F. 93—Summary of Tools Broken or Lost.
- F. 96—Plant Order
- F. 97—Operation Progress Ticket.
- F. 98—Viewing Report
- F. 101—Assembling Sub-Order.
- F. 102—Erecting Sub-Order.
- F. 103—Daily List of Machining Sub-Orders Issued.
- F. 108—Works Product Delivery Note.
- F. 111—Warehouse Daily Report of Despatches from Stock.
- F. 112—Packing Slip.
- F. 113—Advice of Despatch.
- F. 115—Works Accounts Register—I.—*Purchases and Disbursements*
- F. 116—Works Accounts Register—II —*Wages and Works Product.*
- F. 117—Works Accounts Register—III —*Purchase Credits*
- F. 118—Process Product Summary
- F. 119—Finished Stock Product Summary.
- F. 120—Cash Report to Works.
- F. 121—Disbursements Book.
- F. 122—Suppliers' Package Record
- F. 123—General Stock Ledger.
- F. 124—General Stock Rate Card.
- F. 125—Stock Issue Abstract.
- F. 126—Component Stock Ledger
- F. 127—Rough Component Rate Card
- F. 128—Finished Component Rate Card
- F. 129—Cost Allocation Card—I —*Direct Materials and Disbursements*
- F. 130—Cost Allocation Card—II —*Stock Issues.*
- F. 131—Cost Allocation Card—III —*Wages.*
- F. 132—Cost Ledger
- F. 133—Cost Transfer Journal.
- F. 134—Production Oncosts Book
- F. 135—Works Expenses Apportionment Report—I.—*Departments*
- F. 136—Works Expenses Apportionment Report—II —*Sub-Departments*
- F. 137—Plant Orders Cost Summary.
- F. 138—Delivered Orders Cost Abstract.
- F. 139—Stocktaking Slip.
- F. 140—Stock Inventory Sheet
- F. 141—Work-in-Progress Slip.
- F. 142—Work-in-Progress Inventory Sheet.
- F. 143—Loose Plant Rate Card.
- F. 144—Loose Plant Inventory Sheet
- F. 145—Buildings and Fixed Plant Register.
- F. 158—Plant Stoppage Report
- F. 161—Works Product Abstract.
- F. 162—Works Cost Allocation Abstract
- F. 163—Works Accounts Annual Abstract.
- F. 164—Works Profit and Loss Account.
- F. 165—Credit Claim Note
- F. 166—Mechanical Tabulation Ticket.

VII c

ILLUSTRATIONS OF
SPECIMEN FORMS WITH ROUTINE NOTES
AND CROSS-REFERENCE TABLES

CROSS REFERENCES.

F. 1—Staff Application Form.

PAGE

I B. 24 Staff Selection and Control.
I B. 25 Staff Agreement.

FORM

F. 16—Worker's Employment Form.
F. 146—Labour Notification.
F. 147—Labour Order.

F. 1
Staff Application Form.

DEAR SIR,

In the event of a suitable vacancy occurring, your application will be duly considered if you return this form to us carefully filled up in your own handwriting. References to present employers will not be made before an interview has taken place. Only copies of testimonials should be submitted, as they cannot be returned, and should preferably be on this size sheet and typewritten.

Applications are kept for three months only.

We cannot undertake to answer any enquiries as to vacancies.

Yours faithfully

Capacity in which employment is sought

PREVIOUS EMPLOYER	DATES.		BUSINESS.	POSITION HELD.
	From	To		
.....
.....
.....
.....
.....
.....
.....

Particulars of Certificates and Diplomas obtained

Special Qualifications

Age Married or Single Approx. Salary expected

No. of Testimonials enclosed Signed

INTERVIEW NOTES (CONTINUED ON OTHER SIDE).	TERMS OF ENGAGEMENT—IF ARRANGED.
.....
.....
.....
.....

Form used for sending to applicants for staff positions. In the case of an advertised vacancy, form is sent out to likely applicants, with a covering letter arranging an interview.

Form size same as letter paper (say 10" x 8"). Printed with margin for filing.

CROSS REFERENCES.*F. 2—Staff Attendance Book.*

PAGE
I B. 26 **Staff Regulations.**

FORM
F. 3—Staff Weekly Report.
F. 22—Worker's Time Card.

F. 3—Staff Weekly Report.

PAGE
I B. 27 **Staff Regulations.**
VI B. 473 **Cost Allocation Routine.**
VIC. 486 **Works Management and Administration.**
VIC. 486 **Drawing Office General Expenses.**
VIC. 490 **Supervision and Inspection.**

FORM
F. 2—Staff Attendance Book.
F. 28—Worker's Weekly Time Sheet.

F. 2

Staff Attendance Book.

Week ending Saturday.....

Please sign "IN" immediately on arrival, and sign "OUT" on departure at end of day. Arrivals and departures at other than the regular times are to be entered in *red ink*. This rule applies when lateness exceeds five minutes.

NAME.		MONDAY. Time Initials		TUESDAY. Time Initials		WEDNESDAY. Time Initials		THURSDAY. Time Initials		FRIDAY. Time Initials		SATURDAY. Time Initials	
	IN												
	OUT												
	*IN												
	OUT												
Passed by Head of Dept													

This book is arranged for the names of the staff to be set down in a fixed order beforehand and for initialling in the prescribed spaces to be sufficient. The fixed order makes reference easy, and absence is indicated by blank squares. Late arrival and overtime is indicated by the use of red ink. Size of book may be foolscap (13" x 8").

F. 3

Staff Weekly
Report.

DEPT. .. WEEK ENDING SATURDAY ..

[illegible]

Signed Head of Dept.

These reports are particularly necessary in the case of the Drawing Office, when time of draughtsmen is booked against specific orders. A column is provided for aggregating the items of a general character. The form might be used for Chargehands and Inspectors, even when paid by the hour, and not therefore strictly on the staff. The time allocated as "General" in the second money column would be debited as a whole to the appropriate Standing Order. Size of form, say, 8" x 10".

CROSS REFERENCES.

F. 4—Correspondence Endorsement Stamp.

PAGE

I D. 43 Correspondence—General
Routine.

FORM

F. 5—Correspondence Register.
F. 6—Correspondence Index Card.*F. 5—Correspondence Register.*

PAGE

I D. 44 Correspondence—General
Routine.

FORM

F. 4—Correspondence Endorsement
Stamp.
F. 6—Correspondence Index Card.
F. 8—Sales Promotion Index Card.*F. 6—Correspondence Index Card.*

PAGE

I D. 46 Correspondence—Filing Systems.

FORM

F. 4—Correspondence Endorsement
Stamp.
F. 5—Correspondence Register.
F. 8—Sales Promotion Index Card.
F. 44—Print Index Card.

REC'D		TIME	
DEPT. TO REPLY		COPIES TO	
No.			
REPLY DATED		FILE No.	

Inwards letters are endorsed with this stamp, which dates and numbers consecutively at one operation. The numbers correspond with those in the Inwards Correspondence Register, which is entered up from the letters. The time of receipt would only be necessary after the first morning delivery. File No. has reference to the folder or cover in which letter is filed, a copy of reply being filed with same.

F. 4

Correspondence Endorsement Stamp.

TELEGRAMS. Entered in red or underlined in red.										* FORMAL ACKNOWLEDGMENT. Date assumed same as received unless noted. p/a - prelim. ack., f/a - final.										Sheet No. Date										Cut off when Clear.									
Ref No	Time rec'd.	Sender.	Subject Key Words	Copies sent to	Dept to reply.	Summary of Contents if original leaves Corr. Off.	* Ack.	Reply Letter sent.	File No.																														
0																																							
1																																							
2																																							
3																																							
4																																							
5																																							

F. 5

Correspondence Register.

This register is arranged in sheet form to facilitate typing the entries. The size of sheet may correspond with the folders in use, usually about $8\frac{1}{2}'' \times 11''$. The corner is to be cut off when all the letters registered thereon have been dealt with. The column for Subject Key Words is merely as an aid to finding the entry of any particular letter.

FILE No.	
TELEGRAMS.	

F. 6

Correspondence Index Card.

This card is arranged for typing in name and address, or printing in same by means of an addressing machine. The entries on the cards may refer to subject subdivisions under the main file No., and/or may give the dates of the more important letters sent and received. Size of card may be $4'' \times 6''$.

CROSS REFERENCES.

F. 7—Illustrations Register.

PAGE
I C. 30 Publicity.

FORM
F. 44—Print Index Card.

F. 8—Sales Promotion Index Card.

PAGE
I C. 37 Sales Promotion.
I D. 46 Correspondence—Filing Systems.

FORM
F 5—Correspondence Register.
F. 6—Correspondence Index Card.
F 9—Estimate Detail Sheet.
F 10—Estimate and Cost Comparison
Sheet.
F. 11—Tender or Quotation.

CLASS	REF. No.																
<div style="float: right; text-align: right;"> F. 7 Illustrations Register. </div>																	
<div style="border: 1px solid black; height: 150px; width: 100%;"></div>	BLOCK. Style. Made by Date Cost																
	ELECTROS (OR PHOTOS) SENT OUT.																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">No.</th> <th style="width: 25%;">To</th> <th style="width: 25%;">Date sent.</th> <th style="width: 35%;">Date returned.</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	No.	To	Date sent.	Date returned.												
	No.	To	Date sent.	Date returned.													

This register is arranged in removable sheet form rather than on cards. A pull from the block or copy of photo is attached to each sheet. When the space provided for entering "electros sent out" is filled, extra slips can be attached. The No. column should be filled in—one line for each electro—as the electros are ordered, and re-entry made when electros are returned, though usually it hardly pays to get electros returned. This will show the margin of electros available. Size of sheet possibly $8\frac{1}{4} \times 11$ ".

A	B	C	D	E	F	G	H	J	K		
						Credit Status.	Traveller.	Correspondence File No.			
TRAVELLER'S CALLS.		LITERATURE LEFT OR SENT.		FORM LETTERS SENT.		ENQUIRIES RECEIVED.		QUOTN. SENT.		ORDERS RECEIVED.	
Report.	Date.	Key.	Date.	Key.	Date.	Date.	Class of Goods.	Ref.	Order No.	Date.	

This card is intended for following up travellers' calls and enquiries, and for sales promotion by correspondence. The squares at head of card are for applying signal tabs to indicate class of goods in which firm is known to be interested. This facilitates sending out of 'specialised literature. The entries as to travellers' calls will be derived from the Daily Reports. Key letters or symbols are used to indicate the respective catalogues, pamphlets and circular letters. The cards may be headed by means of addressing machines, as used for envelopes (see also Correspondence Index Card). Size of card, 5×8 ". Possibly different colours for different travellers' districts may be useful, or as between exporters, factors and agents.

F. 8
Sales Promotion
Index
Card.

CROSS REFERENCES.

F. 9—Estimate Detail Sheet.

PAGE
 I B. 18 **Production Management.**
 I C. 34 **Selling Prices.**
 I C. 39 **Construction of Estimates.**
 I C. 41 **Construction of Estimates.**

FORM
 F 8—Sales Promotion Index Card.
 F 10—Estimate Reference Sheet.
 F 11—Tender.
 F 12—Office Order.
 F. 60—Estimate for Job Rate.

*F. 10—Estimate and Cost Comparison Sheet.**(Estimate Reference Sheet.)*

PAGE
 I A. 9 **Production Programme.**
 I C. 33 **Selling Prices.**
 I C. 41 **Construction of Estimates.**
 I F. 69 **Administrative Statistics.**
 VI B. 400 **Net Production Costs.**
 VI C. 505 **Nature of Cost Returns.**

FORM
 F. 8—Sales Promotion Index Card.
 F. 9—Estimate Detail Sheet.
 F 11—Tender
 F 132—Cost Ledger
 F 138—Delivered Orders Cost Abstract.

ESTIMATE No.										F. 9		
FOR										Estimate		
Sheet No. Date.										Detail Sheet.		
Quan.	Description.	Drawing and Specification	Class of Material.	Weight (lbs.)	Rate.	Material Cost.	Process Product.	Direct Wages.			Shop Charges.	Notes.
								Dept.	Machine.	Hand.		
											%	

These detail sheets will enumerate every component and fitting required according to Drawings and Specifications. The column for Process Product will comprise mainly Castings and Forgings. Shop Charges will be applied for estimating purposes as a percentage of Direct Wages (either Machine or Hand, and varied according to department), although applied on basis of time worked in the cost accounts. Components entered at inclusive stock prices to be on separate sheet. Each estimate will be summarised on an Estimate Reference Sheet, for comparison with actual cost, if order obtained. Size of sheet may be 8" x 13".

Date of Estimate.	SALES ORDER No.	ESTIMATE No.	Class	Class No.
Order			For	
completed				

PARTICULARS OF ORDER.

F. 10

Estimate and Cost Comparison Sheet.

Ref.	ESTIMATE.	Notes.	Ref.	COSTS.	Notes.
	Drawings, Patterns, Jigs and Special Tools			Drawings, Patterns, Jigs and Special Tools	
	Material Process Products Components at Stock Prices			Mat'l, Special Purch. " General Stock Component Stock Process Products	
	Direct Wages, Machine			Direct Wages, Machine	
	" Hand			" Hand	
	Secondary (as % of above)			" Secondary	
	Shop Charges			Shop Charges	
	Contingency Allowance			Direct Overtime All'ce Errors and Defects Disbursements	
	Final Inspection, Packing and Despatch			Final Inspection, Packing and Despatch	
Certified			Certified		
Date			Date		

This sheet is arranged to serve first as a summary for each estimate, as worked up on the Estimate Detail Sheets. Should an order eventuate, the costs will be entered, in the columns provided, in groups corresponding with the estimate. In printing the form, space may be provided at the foot for comments on the points suggested by comparison of costs against estimate. When complete, and the more obviously necessary investigations made, each set of figures should be submitted to the General Manager. The size of sheet may be 10" x 8", with margin at side for filing.

CROSS REFERENCES.

*F. 11—Tender.**(Quotation.)*

PAGE	FORM
I B. 18 Production Management.	F. 8—Sales Promotion Index Card.
I c. 34 Selling Prices.	F. 9—Estimate Detail Sheet.
	F. 10—Estimate and Cost Comparison Sheet.
	F. 12—Office Order.
	F. 13—Acknowledgment of Sales Order.
	F. 14—Price Enquiry.
	F. 138—Delivered Order Costs Abstract.

F. 11
Tender.

REF.....DATE.....

Kindly quote both when replying.

DEAR SIR,

Agreeably to your instructions of ref..... we have pleasure in submitting this quotation, as detailed below, and trust same will enable you to pass us your orders, which at all times will have our strict attention.

Yours faithfully,

For and on behalf of

.....

Delivered.....

Estimated Time of Delivery.....In case of strikes or stoppages through unforeseen circumstances deliveries may be suspended.

Terms of account: Monthly, less 2½ % cash discount.

Packages will be charged for and credited in full, if returned promptly in good condition, carriage paid.

This offer is open for.....days.

When the nature of the business requires it, tenders may be sent out in neat folders, suitably printed, containing specifications and photos mounted on sheets. The set of papers and folder should be securely fastened together. In some businesses it may be necessary to emphasise that "this offer will not apply to less quantities than specified herewith." In other cases, it will be advisable to incorporate a note to the effect that "We do everything in our power to ensure good material and workmanship together with quick despatch, but we disclaim all responsibility for failure in any of these respects beyond the replacement, wherever practicable, of defective work." Size of form same as letter paper.

CROSS REFERENCES.

*F. 12—Office Order—Sales or Production.**(Sales Despatch Order.)**(Production Order.)*

PAGE		FORM	
I A. 10	Production Programme.	F. 9—	Estimate Detail Sheet.
I A. 11	Production Programme.	F. 11—	Tender.
I A. 13	Production Programme.	F. 13—	Acknowledgment of Sales Order.
J B. 17	Financial Management.	F. 49—	Production Instruction.
I B. 22	Sales Management.	F. 50—	Erecting Specification Card.
IV D. 316	Warehouse Functions.	F. 51—	Sales Sundries Order Specification.
IV D. 321	Sales Order Routine.	F. 52—	Individual Order Progress Chart.
IV D. 322	Warehouse Requisitions.	F. 53—	Quantity Slip.
VI B. 471	Development and Experiments.	F. 57—	Application for Stock Production Sanction.
		F. 107—	Progressive No. Register.
		F. 108—	Works Product Note.
		F. 112—	Packing Slip.

F. 13—Acknowledgment of Sales Order.

PAGE		FORM	
I A. 11	Production Programme.	F. 11—	Tender.
		F. 12—	Office Order.
		F. 51—	Sales Sundries Order Specification.

Date issued		ORDER No.	
COPY FOR	CUSTOMER	Customer's Reference	
		Date	
DELIVERY (Address of Consignee to be given if goods not to be sent direct to Customer)			
PACKAGES MARKED			
Route		Carriage	
			Delivery required
			Invoice Ref.
Checked Acknowledgment sent Order approved			
Price and Terms of Payment Our Tender No.	Copies issued to 1. Invoice Clerk 2. { Estimator and Works Accountant 3. Works Manager 4. Drawing Office 5. Works Office 6. Warehouse	Shipping Instructions Marine Insurance	Deliveries Despatch Ref. Quan. Date Completed Signed
<p>These orders should be typewritten, and with suitable paper and machine, six copies may be obtained at one typing. The form is termed "office order," for use either as a Sales Order, Sales Repairs and Sundries Order, Stock Manufacturing Order, Experimental, Demonstration or any other class of order.* In the case of Sales Repairs and Sundries Orders it may be possible to manage with three copies (Invoice Clerk, Works Office and Warehouse). The bottom right hand corner is to be cut off when the order is completely invoiced. Rubber stamp endorsements will serve to mark items to come from a Stock Manufacturing Order and whether goods are in warehouse or in progress. The size of form may be 10" x 8".</p>			
Date			
Your Order, No. for			
is to hand and has our strict attention.			
We enter at prices as per Terms			
and anticipate making delivery			
<p>This acknowledgment may be in postcard form, with advertising matter thereon. Acknowledgments will not be necessary if goods are despatched same day.</p>			

F. 12

Office Order—
Sales or
Production.

F. 13

Acknowledg-
ment of Sales
Order.

CROSS REFERENCES.*F. 14—Price Enquiry.***PAGE**

I C. 34 **Selling Prices.**
IV B. 280 **Purchase Orders.**

FORM

F. 11—Tender.
F. 15—Purchase Order.
F. 54—Purchase Requisition.

F. 14
Price
Enquiry.

RAILWAY SIDING
 SERVED BY G.W.
 & L. & N. W. RYS.

Ref.....Date.....

Kindly quote both when replying.

DEAR SIRS,

We beg to invite your quotation, stating your best trade and cash discounts, for the supply of the undermentioned goods.

We particularly request that you state your shortest time for delivery or, should you not have the goods in stock, when you could commence delivery and at what rate you could continue.

Yours faithfully,

For and on behalf of

Goods to be delivered carriage paid to these works

Price to be stated per.....

Terms of account: Monthly, less 2½ % unless otherwise quoted.

Packages to be credited in full when returned.

Quotation to be received not later than first post on.....

This form may be printed on ordinary letter paper, but an entirely special form is usually worth while. Enquiries for estimating purposes only should be so marked. The acknowledgment of unaccepted quotations is a courteous practice that obviates enquiries and saves a certain amount of time. A post card (with advertisement matter thereon) may be used, stating "We have duly considered your quotation of.....ref.....for which we thank you, but find ourselves unable to pass you an order on the present occasion." Size of form, say, 10" x 8".

CROSS REFERENCES.

F. 15—Purchase Order.

	PAGE	
I B.	23	Purchases Committee.
IV B.	277	Purchase Specifications.
IV B.	280	Purchase Orders.
IV C.	298	Rejections and Replacements.
VI B.	455	Purchase Invoices.
VI B.	462	Purchase Credits.

FORM
F. 14—Price Enquiry
F. 54—Purchase Requisition.
F. 68—Cross Index Sheet.
F. 69—Casting Instruction.
F. 80—Purchase Delivery Reminder Card
F. 81—Purchase Order Endorsement.
F. 82—Goods Received Note.
F. 110—Warehouse Stock Control Book.

F. 15 .
Purchase
Order.

REQN. NO. PURCHASE ORDER NO. Date

RAILWAY SIDING SERVED BY
G. W. AND L. & N. W. RYS.

It is important to us that this Order No. be marked on the packages and quoted on Advice of Despatch and Invoice.

This Order requires to be acknowledged and delivery confirmed.

We rely on your sending us by post an Advice of Despatch the same day as goods are sent.

To be
noted
in your
Order
Book.

Please supply and deliver carriage free to above works.

DELIVERY REQUIREMENTS.	PRICE OR QUOTN. REF.

Usual Terms: Monthly, less 2½ %.
Specification Sheets enclosed.

Purchase Orders require to be in triplicate, the second copy remaining with the Buyer and the third copy going to the Receiving Clerk, without prices. It will be generally found better to have all three copies loose, rather than for the third to be fast in book form, so as to facilitate reference and to allow the orders to be typewritten. Sometimes, as a safeguard and for numerical reference, the top or executive copy is copied, after being signed, in a press letter book, the order Nos. being added before copying to correspond with the letter book folio. It is generally desirable to confine each order to one item. The back of the Receiving Clerk's copy may be ruled for entering receipts of goods thereon. Provision is made for noting the Purchase Requisition No. Each order will need to be signed by a suitable authority, frequently by the General Manager—a rubber stamp endorsement is assumed for identifying the signature. The Buyer should see that every order is acknowledged and delivery conditions accepted. The General Stores will take over the following-up of each order as to delivery. Size of form may be 6½" x 8½" or even letter size with advantage.

CROSS REFERENCES.

*F. 16—Workers' Employment Form.**(Worker's Engagement Form.)*

PAGE		FORM	
II A. 76	Design for Labour Administration Building.	F. 1—	Staff Application Form.
III F. 239	Works Enquiry Office.	F. 17—	Workers' Character Form.
III G. 249	Works Regulations—Terms of Engagement.	F. 18—	Wages Advice.
V B. 336	Engagement of Workers.	F. 19—	Individual Rate and Earnings Record
		F. 20—	Discharge Note.
		F. 146—	Labour Notification.
		F. 147—	Labour Order.

Time of starting	DATE.	DEPT.	CHECK NO.
Name in full			NEW NOS.
Age (if under 21).....years on 19.....			
Married or Single..... Trade			
Where apprenticed.....			

F. 16

Worker's
Employment
Form.

PARTICULARS OF LAST EMPLOYMENT.

Employer's Name in full.	
„ Address „	
Capacity in which employed	
Foreman's Name.....	Rate of Wages { ... per hour.
Dept.	{ ... per week of hours.
Check No.	{ ... per day of hours.
Length of service.....Date of leaving	Cause

I certify the above particulars to be correct, and seek employment subject to the regulations in force at these Works.

Official copies of all Works Regulations affecting workmen may be seen at the Gatehouse or at Works Enquiry Office.

Signed Applicant.

PARTICULARS OF PREVIOUS EMPLOYMENT, IF ANY, AT THESE WORKS.

Dept.	Check No.	Last Rate.	Length of Service.	Date of Leaving.	Cause.	Ability.	General Conduct.	Time-keeping
.....

I recommend that the above named applicant be engaged as a commencing at the rate of per hour.

Signed Foreman.

Normal Rate

Approved by
Works Manager.

Character written for Received
(Not required for men employed here within previous 6 months or for Apprentices).

Insurance Cards received
in good order.Health. Unemployment.
U I 40.

Discharge Note (upper portion) attached here.	Wages Advices attached here.	Advanced in rate
	
	
		Character sent to on

This form will be made out under the direction of the Wages Office, and, after approval of Works Manager, will be filed under the man's name, with a cross index under check Nos. Size of form may be 10" x 8", doubled in half for filing in card cabinet, the name being written on the back accordingly.

CROSS REFERENCES.

F. 17—Workers' Reference Form.
(Worker's Character Report.)

PAGE
V B. 336 Engagement of Workers.

FORM
F. 16—Workers' Engagement Form.
F. 146—Labour Notification.
F. 147—Labour Order.

CROSS REFERENCES.

F. 18—Wages Advice.

PAGE
 V H. 338 Engagement of Workers.
 V E. 356 Individual Statistics.

FORM
 F. 16—Worker's Engagement Form.
 F. 19—Individual Rate and Earnings
 Record.
 F. 21—Tool Clearance Ticket.
 F. 146—Labour Notification.
 F. 149—Individual Attendance Chart.

F. 19—Individual Rate and Earnings Record.
(Worker's Rate Sheet)

PAGE
 H D. 134 Individual Super-Bonus.
 V E. 356 Individual Statistics.
 V F. 360 Preparation of Wages Sheets.
 V F. 370 National Insurance.

FORM
 F. 16—Workers' Engagement Form.
 F. 18—Wages Advice.
 F. 20—Discharge Note.
 F. 22—Time Card.
 F. 29—Extra Pay Notification.
 F. 31—Wages Sheet
 F. 38—Accident Report.
 F. 149—Individual Attendance Chart.

101	101																								
.....Check No.	Concerning Workman.....Check No.....																								
Present Rate.....Proposed.....	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"></td> <td style="width: 15%; text-align: center;">Present Rate.</td> <td style="width: 15%; text-align: center;">Proposed Rate.</td> <td style="width: 40%; text-align: center;">To date from.</td> </tr> <tr> <td>To date from.....</td> <td>Wages Advance recommended.</td> <td></td> <td></td> </tr> <tr> <td>Transfer from Dept.....</td> <td>Transfer from Dept.</td> <td></td> <td></td> </tr> <tr> <td>Suspended for.....</td> <td colspan="3">Suspended on account of</td> </tr> <tr> <td></td> <td colspan="3">(Tool Clearance Ticket issued.)</td> </tr> <tr> <td></td> <td>Wks. Mgr.'s Signature</td> <td>Foreman's Signature</td> <td>Date.</td> </tr> </table>		Present Rate.	Proposed Rate.	To date from.	To date from.....	Wages Advance recommended.			Transfer from Dept.....	Transfer from Dept.			Suspended for.....	Suspended on account of				(Tool Clearance Ticket issued.)				Wks. Mgr.'s Signature	Foreman's Signature	Date.
	Present Rate.	Proposed Rate.	To date from.																						
To date from.....	Wages Advance recommended.																								
Transfer from Dept.....	Transfer from Dept.																								
Suspended for.....	Suspended on account of																								
	(Tool Clearance Ticket issued.)																								
	Wks. Mgr.'s Signature	Foreman's Signature	Date.																						

F. 18
Wages
Advice.

These slips will be made out by the respective foremen and passed to the Wages Office, who will submit them to Works Manager for approval, accompanied, if necessary, by the Worker's Engagement Form, Rate Sheet, and Attendance Chart, thus informing the Works Manager fairly fully of the man's record to date. In the case of transfers, which should be reported by the Foreman of the Dept. receiving the man, the Tool Stores and Foreman will need to be advised by the Wages Office as to the man's new check No. The form is arranged for a counterfoil record, to be kept by the Foreman, though a carbon copy would be quite feasible. Size of form should suit space provided on the Engagement Forms, say, $2\frac{1}{2}'' \times 6''$. The slips and counterfoils are numbered. For transfers, the Labour Notification Form, F 146, may be used instead.

	Year.	Name.	Check No.
--	-------	-------	-----------

F. 19
Individual
Rate and
Earnings
Record.

NOTES re-INSURANCE STAMPS, EXEMPTIONS, ETC.,
AND APPRENTICES' ADVANCES.

Check No.	Wages Week No.	Rate.	Insurance Stamps.				Time Wages.	Extra Pay.	Total Earnings.	Hours Lost	Omission to Stamp Time Card.	Notes.
			Workman.		Employer.							
			Health.	Unemp.	Health.	Unemp.						
	1											
	2											
	3											

* This sheet is designed to serve in the first instance as the office register for checking the rates and insurance stamp values as entered on the Wages Sheets. In the latter case variations from regular values will have to be verified by the person checking, and the amended value entered in register in red ink. Otherwise a tick for each week serves to continue any rate or stamp value and to confirm that stamping was involved. See discussion, Section V f. There is thus built up a clear record for claiming Unemployment Refund from the Insurance Commissioners. Pending changes in contributions owing to passing of age 16 can be indicated against the week No. first concerned, thus obviating oversight. It is possible to extend the functions of this sheet to include a record of Time Lost and Extra Pay each week for administrative purposes and a record of Total Earnings each week for Accident Compensation purposes, and for the preparation of Income Tax returns by the Works Manager. A column is provided for Check No. in case of changes during the course of the year. The Check No. at head of sheet would then be altered, and the sheet moved into corresponding sequence. The use of Wages Week Nos. allows them to be printed in for any year, and a table will give the corresponding week ending date. The form should be printed to give 52 weeks in two sets of 26 on the one side only of the sheet. Size of form may be $8\frac{1}{2}'' \times 11''$. Margin at side for filing.

CROSS REFERENCES.

F. 20—Discharge Note.

PAGE	FORM
III F. 240 Works Enquiry Office.	F. 16—Worker's Engagement Form.
V B. 338 Discharge of Workers.	F. 19—Individual Rate and Earnings Record.
V F. 367 Preparation of Wages Sheet.	F. 21—Tool Clearance Ticket.
V F. 368 National Insurance.	F. 35—Special Pay Ticket.
	F. 146—Labour Notification.
	F. 148—Worker's Discharge Paper.
	F. 149—Individual Attendance Chart.

F. 21—Tool Clearance Ticket.

PAGE	FORM
II E. 142 Tool Custody.	F. 18—Wages Advice.
III G. 255 Works Regulations—Tools and Drawings.	F. 20—Discharge Note.
V B. 339 Discharge of Workers.	F. 91—Tool Loan Slip.
VI D. 511 General Costs—Iron Foundry.	F. 92—Tool Permanent Loan Record.

		To THE WAGES OFFICE.		Date.....													
Timekeeping.....	Please pay off Workman..... Check No.....																
Length of Service.....	at.....to-day (Tool Store Chargehand notified).																
Notes as to re-employment, etc.	Capacity in which employed.....																
	Reason of Discharge.....																
	Ability as a Workman.....																
	General conduct and industry.....																
Works Manager.	At least one hour's notice should be given to Wages Office.				Foreman.												
PAYMENT DUE.	TIME.	DATE.	NAME.	CHECK NO.													
Tool Clearance Ticket must be obtained and attached here before payment is made.	For Week No.....		Time Wages.....hrs. @...	<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>													
	ending.....		Extra Pay.....														
	Less Insurance (Workman's) Health		Unemp.														
Insurance (Employer) Health		Unemp.															
	Certified.....		Wages Clerk.	INSURANCE CARDS RECEIVED.													
	Checked and			Health.													
	Paid by.....		Received by.....	Unemp.													

F. 20
Discharge
Note.

These Discharge Notes are made out by the Foreman as to the upper portion, except as to the left-hand side, which is filled in by the Wages Office. This upper portion is detached by the Wages Clerk before submitting same to Works Manager, and only the lower portion is seen by the workman when being paid. A Tool Clearance Ticket (F 21), when received, must be attached as indicated. Size of form to suit space provided on Engagement Form for attachment of upper form, say, $2\frac{1}{2}'' \times 7''$ for each portion, or $5'' \times 7''$ in all.

This form may be used, as to the lower portion, for paying up suspended men. The upper portions would be left blank and destroyed.

The Cashier will receive the "payment due" voucher from the Wages Office, and only pay out on presentation by the workman of his time card. The vouchers, after payment, may be mounted in a guard book for reference.

To THE TOOL STORE CHARGEHAND. Dept.....		To THE WAGES OFFICE. The tools booked out					
Check No.....		on loan to..... Check No.....					
is leaving at.....to-day.		have, with the following exceptions, been					
is to be suspended at.....to-day.		returned.					
Please therefore look into his tool account and see that all is satisfactory before issuing attached Tool Clearance Receipt to him on his applying for same.		<table border="1"> <tr><td colspan="2">Value.</td></tr> <tr><td></td><td></td></tr> </table>		Value.			
Value.							
Total Amt. of Wages to be held back.							
Date.....	Signed.....	Date.....	Signed.....				
Foreman.		Tool Store Chargehand.					

F. 21
Tool
Clearance
Ticket.

This ticket is designed so that the Tool Store Chargehand may have the necessary advice before any man leaves, and be prepared with the Tool Clearance Receipt at the appointed time. The workman should be informed by his Foreman as to leaving or suspension, and should apply accordingly for a Tool Clearance Ticket. Size of form to suit Discharge Note, say, $2\frac{1}{2}'' \times 7''$, perforated down centre.

CROSS REFERENCES.

*F. 22—Time Card.**(Pay Card.)*

PAGE		FORM	
II A. 76	Design for Labour Administration Building.	F. 2—	Staff Attendance Book.
III G. 251	Works Regulations, Entering or Leaving Works.	F. 19—	Individual Rate and Earnings Record
III G. 253	Works Regulations, Payment of Wages.	F. 23—	Overtime Ticket.
V C. 342	Time Recording.	F. 25—	Job Advice.
V D. 349	Job Records.	F. 26—	Job Account Card.
V D. 354	Timebooking Methods.	F. 28—	Weekly Time Allocation Sheet.
V F. 360	Preparation of Wages Sheets.	F. 29—	Extra Pay Shp.
V F. 363	Payment of Wages.	F. 31—	Wages Sheet.
		F. 33—	Pay Notification.
		F. 34—	Unclaimed Pay Report.
		F. 35—	Special Pay Ticket.
		F. 149—	Individual Attendance Chart.
		F. 150—	Lost Time Summary.
		F. 155—	Job Ticket.
		F. 156—	Group Work Card.
		F. 157—	Pay Query Card.

*F. 23—Overtime Authorisation.**(Overtime Ticket.)*

PAGE		FORM	
III G. 250	Works Regulations, Overtime.	F. 22—	Time Card.
V C. 349	Overtime Control.	F. 28—	Weekly Time Allocation Sheet.
		F. 149—	Individual Attendance Chart.

F. 24—Gate Pass.

PAGE		FORM	
III G. 251	Works Regulations, Entering or Leaving the Works.	F. 36—	Away Expenses Sheet.
III G. 255	Works Regulations, Accidents.	F. 37—	Away Time Sheet.
III H. 263	Works Patrols.	F. 113—	Advice of Despatch.
		F. 149—	Individual Attendance Chart.
		F. 151—	Meal Pass.
		F. 152—	Leave of Absence Ticket.

NAME.		CHECK No.									
WEEK No.		ENDING WEDNESDAY.									
ONLY CLOCK STAMPING WILL BE RECOGNISED.											
DAY.	LOST TIME	A	Before Break-fast.	After Break-fast.	After Dinner.		Wages Office will fill these in				
		P		After Tea.		On Finish-ing	Hours Worked	Overtime Allowance			
			IN	IN	IN	OUT					
Th.		A									
		P									
F		A									
		P									
S		A									
		P									
Su		A									
		P									
M		A									
		P									
Tu		A									
		P									
W		A									
		P									
TOTALS											

This card is issued again on Fridays as a Pay Card.

This Time Card is shown with the reverse side alongside the front of the card. The notes incorporated in the design as to the application of the "clocking" spaces are not usually necessary, and are only inserted by way of demonstration. A rubber stamp endorsement on the back of the card (right-hand view) will serve for entering any deductions from pay when card is used as a Pay Card. Extra Pay Slips can be attached by stapling, giving details of Extra Pay and Special Allowances. The segment at top of card is to indicate which side out for stamping, and affords distinction if different coloured inks are used in lieu of coloured cards. Size of card to suit time recorder (say $7" \times 3\frac{1}{2}"$).

Date.....
This is to authorise and instruct Workman,
Check No.....to work overtime
till.....p.m. on Order No.....
Signed.....Foreman.

As indicated on Time Card above, Overtime Tickets are necessary for authorising all overtime, except when the whole dept is working late. The tickets will be handed to the Gate-keeper serving as a gate-pass. Size of form, say, $2\frac{1}{2}" \times 3\frac{1}{2}"$.

F. 23

Overtime
Authorisation

Date.....
This is to authorise Workman, Name.....
.....Check No.....
to passat.....
Business
A.D. Ref.....Foreman.

Passes for men leaving early or arriving at unusual hours are necessary for effective gate control. Size of form, say, $2\frac{1}{2}" \times 3\frac{1}{2}"$. Colour should be distinguishable readily from Overtime Ticket. A.D. Ref. means Advice of Despatch No. when man is sent to an Away Job.

F. 24

Gate Pass.

CROSS REFERENCES.

F. 25—Job Advice.

PAGE		FORM	
I D. 47	Internal Correspondence.	F. 22—	Time Card.
II D. 121	Extra Allowances	F. 26—	Job Account Card.
III G. 252	Works Regulations - Payment by Results.	F. 27—	Daily Time Slip.
V D. 353	Timebooking Methods.	F. 28—	Weekly Time Allocation Sheet.
V F. 364	Extra Pay Computation.	F. 29—	Extra Pay Notification.
		F. 98—	Viewing Report.
		F. 155—	Job Ticket (alternative to F 26).
		F. 156—	Group Work Card.

F. 26—Job Account Card.

*Including Job Rate Notification and Extra Pay Notification.
(Job Ticket.)*

PAGE		FORM	
II D. 119	Preparation Allowance.	F. 22—	Time Card.
II D. 120	Operating Allowance.	F. 25—	Job Advice.
II D. 121	Extra Allowances.	F. 28—	Weekly Time Allocation Sheet.
II G. 166	Shop Inspection.	F. 29—	Extra Pay Notification (Summary).
III B. 195	Factory Acts.	F. 61—	Job Record Sheet.
III C. 211	Trade Union Agreements.	F. 73—	Foundry Daily Work Sheet.
III G. 252	Works Regulations—Payment by Results.	F. 78—	Smithy Daily Work Sheet
V D. 349	Job Records.	F. 97—	Progress Ticket
V F. 360	Preparation of Wages Sheet.	F. 155—	Job Ticket (alternative to F 26)
V F. 365	Extra Pay Computation.	F. 157—	Group Work Card
		F. 166—	Mechanical Tabulating Ticket.

Dept. Check No.				
Change of Job.	Sub-Order.	P.N. or A.U.	Operation.	Machine No.
OFF				Strike out words that do not apply.
ON				Finished. Interrupted.
Quantity.	TIME AND DATE.		Extra Allowances noted on back.	Signed.

These slips are made out by the Section Hand or Foreman at each change of job, to be collected through the works post and passed to Ratefixer. Re-start slips may pass direct to Wages Office. Extra allowances as noted on back are subject to confirmation by Ratefixer.

Distinctive colours should be adopted for machine and hand work.

F. 25

Job Advice.

JOB RATE NOTIFICATION.	Sub-Order.		Operation.	Check No.
	Match. No.	Prep. Allowance	Operation Allowance each.	Date.
				Signed.
Description.		Prod. Order.	Sub-Order.	
P.N. or A.U.	Operation.		Quantity to be worked.	
Operation No.	Preparation Allowance.			
Average Time taken per piece.	Operation Allowance.	Quantity Accepted.		
	TOTAL JOB RATE.			
Average Hourly Output	Extra Allowances.			

These cards are made out by the Ratefixer or his assistant from the Job Advice Slips as far as possible, and confirmed by reference to the job itself, which will be necessary for passing the job rate.

The amount of descriptive information required will vary according to the sufficiency of a P.N. (Part No.) or A.U. (Assembly Unit) Ref. by itself.

Job Account Cards and Job Advice Slips are passed as quickly as possible to the Wages Office—the slips being there utilised for making up the Weekly Time Allocation Sheet (F 28).

The completion of each job account involves receipt of a Progress Ticket with particulars of quantities passed as correct.

Provision is made for entering up the time worked, and this ruling may be continued on the back of the card.

Extra Allowances must be authorised by Job Advice Slips. The ruling for entering the extra pay due will depend on the plan adopted for calculating same.

The averages indicated at side of form are for job record purposes. Only one average need usually be worked out.

The cards may require to be numbered for identification purposes, but this will hardly be necessary if a sub-order is adhered to.

Distinctive colours should be used for Machine Work and Hand Work.

The counterfoil, Job Rate Notification, is intended for the worker, and should reach him practically at the start of the job. The second counterfoil, Extra Pay Notification, is completed by the Wages Office, and goes in the pay envelope or is summarised on F 29.

F. 26

Job Account Card.

Check No.	Machine No.	Week No.	Hours Worked.	Time Rate.
Extra Pay Due.				
EXTRA PAY NOTIFICATION.	Sub-Order.		Week No.	Check No.
	Operation.		Extra Pay.	

CROSS REFERENCES.

*F. 27—Daily Time Slip.**(Daily Docket.)*

PAGE		FORM
III G. 252	Works Regulations, Payment by Results.	F. 25—Job Advice Slip.
V D. 350	Timebooking Methods.	F. 28—Weekly Time Allocation Sheet.
V F. 365	Extra Pay Computation.	F. 156—Group Work Card.

*F. 28—Weekly Time Allocation Sheet.**(Weekly Time Sheet.)*

PAGE		FORM
II D. 119	Building up Job Estimate.	F. 3—Staff Weekly Report.
V D. 348	Job Records.	F. 22—Time Card
V E. 350	Timebooking Methods.	F. 23—Overtime Authorisation.
V F. 365	Extra Pay Computation.	F. 25—Job Advice.
VI A. 444	Diagram of Cost Accounting Stages.	F. 26—Job Account Card.
VI B. 450	Cost Allocation Principles.	F. 27—Daily Time Slip
VI B. 463	Wages Allocation.	F. 29—Extra Pay Notification.
VI B. 467	Net Production Costs.	F. 30—Wages Allocation Weekly Summary.
VI B. 475	Cost Allocation Routine.	F. 37—Away Time Sheet
VI B. 476	Cost Allocation Agreement.	F. 131—Cost Allocation Card (III.).
VI C. 489	Overtime Expenses.	F. 155—Job Ticket.
		F. 156—Group Work Card.
		F. 166—Mechanical Tabulating Ticket.

	Date.....			
Mach. No. Wk. No. Check No.				
Sub Order No.	PARTICULARS OF WORK DONE.	Time On.	Time Off.	Hours on Job.
Entered.	Passed.	Above is - Correct.		
Wages Office.	Foreman,	Workman,	Total.	

Daily Slips on these lines are necessary for allocating the time of men on short jobs or on work for other reasons not amenable to Job Advice Slips

The particulars given are summarised on Weekly Time Allocation Sheets in the Wages Office, when overtime allowances can be dealt with and a certain amount of discretion used in finally allocating the time as booked by the workman.

Size of Slip may be $2\frac{1}{2}'' \times 3\frac{1}{2}''$, made up in pad form for issue to the men concerned ready numbered, etc., or possibly distributed daily when collecting the previous day's slips. Attention must be given to ensure that the slips are filled in promptly at the changes of job. Colour of form should differ from Job Advice Slip.

F. 27

Daily Time
Slip.[illegible]

F. 28

Weekly Time Allocation Sheet.

These sheets may be headed by a mechanical addressing machine.

• The sheet is designed to serve several functions. Firstly, the times "ON" and "OFF" as derived from the Job Advice Slips are entered in the spaces provided. This allows a ready survey that the changes of jobs as notified exactly cover the week's time. The hours to be accounted for each day are derived from the Time Cards, and entered at the top of the column for each day's time in the spaces provided. The Wages Office have to complete these sheets, and will learn from the Job Advice Slips if job is finished, so that the time to date on Unfinished Jobs can be carried forward to the next week's sheets. This arrangement will provide figures for booking the time on the Job Account Cards. Some bookings will come from Daily Time Slips.

The treatment of Overtime Allowances may be by allocating to orders or to a special account (see discussion). The provision made on sheet provides for either course as occasion demands. Analysis is provided for the Wages Allocation of the Direct Wages (as distinct from Overtime Allowances) under two headings of Sale and Non-Sale. This will allow some useful figures to be built up on the Wages Allocation Weekly Summary. The provision made for Shop Charges allows for the use of individual rates for each producing unit (see discussion), or for flat departmental rates, applied preferably as an hourly rate or burden. Size of form may be $7\frac{1}{2} \times 10\frac{1}{2}$. Distinctive colours, as adopted for Job Advice Slips, and Daily Time Slips, should be used for Machine Work and Hand Work. Secondary Labour, such as Inspection on the one hand, and unskilled labour on the other, may be entered on white sheets.

CROSS REFERENCES.

*F. 29—Extra Pay Notification.**(Extra Pay Summary.)**(Piecework Balance Ticket.)**(Premium Ticket.)**(Bonus Ticket.)*

PAGE		FORM
III B. 195	Factory Acts.	F. 19—Individual Rate and Earnings Record.
III G. 252	Works Regulations—Payment by Results.	F. 22—Time Card.
V F. 381	Preparation of Wages Sheets.	F. 25—Job Advice.
V F. 386	Extra Pay Computation.	F. 26—Job Account Card.
VI B. 463	Wages Allocation.	F. 28—Weekly Time Allocation Sheet.
VI B. 475	Cost Allocation Routine.	F. 31—Wages Sheet.
		F. 33—Pay Slip.
		F. 35—Special Pay Ticket.
		F. 73—Foundry Daily Work Sheet.
		F. 131—Cost Allocation Card (III.).
		F. 155—Job Ticket.
		F. 157—Pay Query Card.

*F. 30—Wages Allocation Weekly Summary.**(Departmental Time Allocation Summary.)*

PAGE		FORM
I F. 66	Administrative Statistics.	F. 28—Weekly Time Allocation Sheet.
I F. 67	Administrative Statistics.	F. 31—Wages Sheet.
V D. 348	Job Records.	F. 32—Wages Abstract.
VI B. 450	Cost Allocation Principles.	F. 136—Works Expenses Apportionment Report (II.).
VI F. 557	Production Oncosts Accounts.	F. 166—Mechanical Tabulating Ticket.
VI G. 565	Nature of Cost Returns.	

Process.	Week No.	Check No.
Sub. Order No.		

The results of each job as recorded on the respective Job Tickets are summarised each week under each man's No. on these slips. The total extra pay due for the week is entered in the outside column. The slips are arranged in perforated strip form and for a carbon copy to be taken. From this copy the individual totals are entered on the Wages Sheets. Grand totals are made on the carbon copies for checking against the Wages Sheet grand totals. As the Works Accounts Office require the carbon copies for cost allocation purposes,

folded loose sheets are preferable to the carbon copies being fast in a book. Colour scheme suggested for Job Advice Slips should be followed. Size of slip may be $2\frac{1}{2}'' \times 3''$ for attaching, by staple, to the Time Card. Similar slips may be utilised for recording Special Allowances. Jobs on which the Time Limit is exceeded should be entered on Excess Time Slips arranged on these lines and duly issued to the men.

F. 29

Extra Pay
Notification.

Figures below assumed efficiency level underlined in red.

WEEK ENDING WEEK No.

Order Series.	Wages Divisions.	Dept.	Dept.	Dept.	Dept.	Dept.	GROSS TOTALS.			
							Wages Divisions.			Order Group
							Machine.	Hand.	Secondary	
SALE A.B.C.	Machine Hand Secondary									
NON-SALE D.N.E.S.	Machine Hand Secondary									
PROCESS PRODUCTS	Machine Hand Secondary									
SUNDRIES	Machine Hand Secondary									
	Total									
OVER-TIME ALLOWANCES	Machine Hand Secondary									
	Total									
EXTRA PAY	Machine Hand Total									
SHOP CHARGES	Machine Hand Total									
HOURS WORKED	Machine Hand Total									

F. 30

Wages
Allocation
Weekly
Summary.SUMMARY
READY.

Time.....

Date.....

Certified.....

Noted.....

.....

Works
Manager.

This summary is arranged to facilitate agreement between the wages allocated and wages paid. The figures as to allocation are derived from the individual Weekly Time Allocation Sheets by mechanical means—any other method being prohibitive in time and cost. The functions of the summary are discussed under Works Accounts. Certain other functions are possible in giving the Works Manager a survey of the works activities in terms of money, and particularly to indicate abnormal conditions antagonistic to commercial efficiency. Size of sheet must depend on number of departments to be provided for.

CROSS REFERENCES.

F. 31—Wages Sheet.

PAGE	FORM
II A. 77 Design for Labour Administration Building.	F. 19—Individual Rate and Earnings Record.
V F. 360 Preparation of Wages Sheets.	F. 22—Time Card.
VI B. 463 Wages Allocation.	F. 29—Extra Pay Notification.
	F. 30—Wages Allocation Weekly Summary.
	F. 32—Wages Abstract.
	F. 33—Pay Notification.

F. 32—Wages Abstract.

PAGE	FORM
V F. 361 Preparation of Wages Sheets.	F. 30—Wages Allocation Weekly Summary
	F. 31—Wages Sheet.
	F. 37—Away Time Sheet.
	F. 116—Works Accounts Register (11).
	F. 120—Cash Report to Works.

*F. 33—Pay Notification.**(Pay Tin Slip.)**(Pay Envelope.)*

PAGE	FORM
II A. 76 Design for Labour Administration Building.	F. 22—Time Card.
III G. 253 Works Regulations—Payment of Wages.	F. 29—Extra Pay Notification.
V F. 362 Preparation of Wages Sheets.	F. 31—Wages Sheet.
V F. 363 Payment of Wages.	F. 34—Unclaimed Pay Report.
	F. 35—Special Pay Ticket.
	F. 157—Pay Query Card.

F. 34—Unclaimed Pay Report.

PAGE	FORM
V F. 364 Payment of Wages.	F. 22—Time Card.
	F. 33—Pay Tin Slip.
	F. 35—Special Pay Ticket.
	F. 157—Pay Query Card.

(PAY SHEET)														WEEK ENDING.....				WEEK NO.....			
Dept.	Check No.	Name	Capacity employed	Hours	Wages paid	Time Wages	Extra Pay	Special Allowances	Gross Wages	Deductions Fines	Insurance Worker		Net Wages	Insurance Employer		Stamps					
											H/1h	Un.		H/1h	Un.	D	D	D	D		

In view of the number of totals involved, it is better to total each sheet separately and summarise on another sheet—grouping the sheet totals to correspond with the pay sections, as paid at one pay station, the sheets being marked at head accordingly. The number of lines on each sheet should agree with the number of Pay Notifications (F 33) in one sheet. To allow of advance writing up of sheets as to check Nos. of names and rate (an addressing machine may be used), new men should be entered at the tail end of the department for the first week. The wages paid before the usual time (e.g. to men leaving) should be entered on a separate sheet, and not made up with the ordinary wages. Size of sheet may be 14½" x 10½", used on one side only, and held in binder (possibly separate for each fortnight).

WEEK ENDING.....														WEEK NO.....			
Discharges interlined in black ink. Away Time noted at foot but paid through Petty Cash.																	
Dept.	No Absent.	NO. WORKING.					Time Wages.	Extra Pay.	Special Allow- ances.	Deduc- tions (in red).	Dept. Total (for alloca- tions).	Insurance.					
		Men.	Juniors.	Artisan's.	Total.	Increase						Decrease	Employer's Contribu- tions.				

This abstract requires to be submitted to the Works Manager and General Manager. It must agree in total with the summary of the Wages Sheets as made up for pay purposes, with the inclusion of all wages paid before the usual time. The Dept. Totals will ignore deductions made on behalf of the workers' insurance contribution. These totals are used for checking the wages allocations. Size of form should agree with Wages Sheets or of letter paper according to method of filing.

CHECK NO.....		Net Wages	These slips are arranged in sheets, the quantity agreeing with the number of lines on the Wages Sheets. The net wages as entered on the slips are totalled and compared with Wages Sheets. When in order, the slips are separated and the pay tins made up from them and the slips put in the tins (see discussion). Notes may be made on slip of any fines, amounts overpaid or paid short, etc. Size of slip to suit pay tin.

PAY..... 6 p.m., Friday.....						
To be filled in by Pay Clerk at end of pay and handed to Cashier with money in pay tins. Pay Clerk and Cashier to sign. Time Card to be obtained by Workman from Wages Office and handed in when pay is claimed. After Monday night, remaining pay tins emptied and Special Pay Ticket required from Wages Office to claim pay.						
Check No.	Name	Notes, as on Pay Tin Slip.	Amount Un-claimed.	Date Paid.	Received by (if paid out on Time Card) or Voucher No. of Special Pay Ticket.	Cash Folio.

The notes embodied in form sufficiently explain routine. Size of form may be 5" x 8", with carbon duplicate (unprinted).

F. 32

Wages
Abstract.

F. 33

Pay
Notification.

F. 34

Unclaimed
Pay Report.

CROSS REFERENCES.

F. 35—Special Pay Ticket.

PAGE	FORM
III G. 253 Works Regulations, Away Allowances.	F. 20—Discharge Note.
V F. 361 Preparation of Wages Sheets.	F. 22—Time Card.
V F. 363 Payment of Wages.	F. 29—Extra Pay Slip.
	F. 34—Unclaimed Pay Report.
	F. 36—Away Expenses Sheet.
	F. 37—Away Time Sheet.
	F. 120—Cash Report to Works.

F. 36—Away Expenses Sheet.

PAGE	FORM
III G. 253 Works Regulations, Away Allowances	F. 24—Gate Pass.
V F. 363 Payment of Wages.	F. 35—Special Pay Ticket.
	F. 37—Away Time Sheet.
	F. 113—Advice of Despatch.
	F. 120—Cash Report to Works.

F. 37—Away Time Sheet.

PAGE	FORM
III G. 253 Works Regulations, Away Allowances,	F. 24—Gate Pass.
V F. 363 Payment of Wages.	F. 28—Weekly Time Allocation Sheet.
VI B. 458 Disbursements.	F. 32—Wages Abstract.
	F. 35—Special Pay Ticket.
	F. 36—Away Expenses Sheet.

Payable at o'clock on for Wages Account, Week No. ending							
To THE CASHIER. Please pass to Workman Check No.							
Postal Address							
Extra Pay (not made up at time of discharge) as per allip							<div style="border: 1px solid black; width: 60px; height: 60px; margin: auto; border-radius: 50%;"> Voucher No. </div> <div style="margin-top: 20px;">TOTAL. £ s. d.</div>
Away Time as per time sheet attached							
Current Wages (in advance of regular pay), on production of Time Card							
Wages unclaimed (on production of Time Card)							
Cash to be accounted for (Passed..... Works Manager)							
CERTIFIED BY		PAID BY		RECEIVED BY			
..... Wages Clerk							
<p>This ticket serves for the Wages Office to control works payments without handling any cash. Money required in advance for men going away, etc., is authorised by the Works Manager, the Wages Office having to see that an Away Expenses Sheet is submitted for settlement in due course. Size of form, say, 5" x 8", with carbon duplicate (unprinted).</p>							
<p>Receipted Bills are required for all payments other than fares not covered by allowance. Expenses must be settled immediately on return to Works. Name Check No. Where working Date out Date of return</p>							
Date.	Order No.	Details of Expenses.				Fares.	
Workman's Signature		Cash advanced	Checked	Material accounted for		Passed	
		 Wages Office Warehouse		Works Mgr.	
<p>The Wages Office will issue these sheets as money is advanced for Away Expenses, and when workman returns, must see to prompt settlement. When Works Manager has passed sheet (reference having been made to Warehouse as to materials had for job), the Wages Clerk will accompany man to Cashier and obtain a clearing signature on his carbon copy of Special Pay Ticket for cash to be accounted for, which may be then handed to man. Size of form, 5" x 8".</p>							
<p>Week No. ending Wednesday</p> <p>Name Check No.</p> <p>Where working</p>							
Date.	Order No.	Description of Work Done.	Day.	Com- menced Work.	Ceased Work.	Length of Meal Time.	Hours Worked.
Signed		Insurance	Our clients are respectfully requested to sign for our workman's time each week and on completion of work.			Officer in charge at place of work.	
..... Workman.							
<p>The Gatekeeper must see to each man having an Away Time Sheet, when sent out, as evident from the Gate Pass, and advise Wages Office, who will continue the matter. Each time sheet will need to be passed by Works Manager, and payment authorised by a Special Pay Ticket. After payment the sheets may pass to the Works Accounts Office for filing. Size of form, 5" x 8".</p>							

F. 35 .
Special Pay
Ticket.

F. 36
Away
Expenses
Sheet.

F. 37
Away Time
Sheet.

CROSS REFERENCES.*F. 38—Accident Report.*

PAGE	FORM
II A. 76 Design for Labour Administration Building.	F. 19—Individual Rate and Earnings Record
II G. 163 Duties of Foremen.	F. 149—Individual Attendance Chart.
III B. 196 Factory Acts.	F. 150—Lost Time Summary.
III D. 229 Accident Treatment	F. 153—Casualty Log Book.
III G. 256 Works Regulations—Accidents.	
V C. 340 Functions of Timekeeping.	

F. 38
Accident
Report.

INJURED PERSON.		REPORT NO.
Name in full	Check No.....	Duration of Disablement.
Private Address		Average Weekly Earnings.
Age last birthday		Total Compensation.
Capacity in which employed.....		
Employer's Name if working for outside firm		
ACCIDENT.		NOTE.
Date	Time.....Place	Where plant or Machinery has given way, it must be preserved and, as far as possible, retained in position as at time of accident for inspection by Works Manager, who will instruct further as to disposal.
Particulars of Injury		
How caused		
Was machinery in motion by power at time of accident ?		
By whose negligence, if any, was accident caused ?		
Witnesses of Accident.....		DATE NOTICES SENT.
Precise occupation of injured person at time of Accident		Factory Inspector }
Time he commenced work on day of accident.		Certifying Surgeon }
Time he ceased work on account of accident.		INSURANCE CO.
Place to which removed (if unable to resume work after attendance at Gate House		1st Notice.....
Name of Medical Man in attendance.		Claim
Probable duration of disablement		2nd Notice.....
Remarks as to Machine Guards.		Entered in Home Office General Register
Date reported.....Signed.....Foreman in charge		Passed.
		Wks. Mgr.
Date work resumed.....Noted		Works Med. Referee
<p>Where there is a properly organised Casualty Station or Ambulance Room, the nurse should keep a casualty log-book of every accident dealt with. From this log-book, the Time Office prepare accident reports, in respect to those necessitating absence from work, as laid down by the Factory Acts. For the official report it is advisable that the Time Office should verify the circumstances of each accident by reference to the foreman concerned—consulting the Works Medical Referee when there is such an officer.</p> <p>The Time Office can prepare all the reports required by the Home Office and Insurance Company in collaboration with the Wages Office as to average earnings. This office can also keep the Factory General Register (Home Office Form 37) as to notifiable accidents, young persons and children employed, lime-washing, boiler inspection, crane and chain tests, etc. Certain Dangerous Occurrences and Fires, whether causing personal injury or not, are required to be reported to the Factory Inspector.</p>		

CROSS REFERENCES.

F. 39—Standard Fittings Sheet.

PAGE	FORM
II B. 87 Designs.	F. 40—Component Design Comparison Sheet.
II B. 92 Drawing and Product References.	F. 48—Component Assembly List.
II B. 96 Drawing and Product References.	F. 109—Works Product Finished Weight Card.
II C. 110 Pattern Marks.	
IV C. 293 Stock Classification.	

F. 40—Component Design Comparison Sheet.

PAGE	FORM
II B. 87 Design.	F. 39—Standard Fittings Sheet.
	F. 42—Component History Card.
	F. 61—Job Record Sheet.
	F. 109—Works Product Finished Weight Card.

Class of Article..... Ref. No. S.F.....												
Description												
Maker (If Specialty).....Material.....												
OUTLINE SKETCH.												
Sub-Mark.	Drawing No. or Maker's Ref.	LEADING DIMENSIONS.						Notes.	Fin'd Weight.	Stock Mark.	Date Added.	Edition No.
		a	b	c	d	e	f					
A B C D												

F. 39
Standard
Fittings Sheet

These sheets are intended for tabulating all fittings locally standardised for design purposes. Where any item is held regularly in stock, an asterisk should be placed under Stock Mark, together with the date of adding the item to stock. The column for Edition No. is to identify the prints as issued for new items. The Sub-Mark is the letter affix used with the S.F. No. The original form requires to be on tracing cloth (for photo-prints), adapted for filing in a Design Reference Book.

Name of Component										Design Class No.....	
OUTLINE SKETCH.											
Part No.	Drawing No.	LEADING DIMENSIONS.						Notes.	Mater- ial.	Fin'd Weight.	Edition No.
		a	b	c	d	e	f				

F. 40
Component
Design Com-
parison Sheet

This sheet is provided for tabulating the leading dimensions of similar components as a guide to future design—the form being on tracing cloth, with a view to photo-prints being placed in each draughtsman's Design Reference Book. The value of the scheme depends on readily finding the sheet required, and to this end a classification system is necessary. This may be the same as that adopted for filing Job Data. With a unit system of drawings, the prints themselves may be classified, and would only necessitate a tabulation of sizes on these lines in a comparatively few instances.

CROSS REFERENCES.

F. 41—Component Register.

PAGE	FORM
II B. 95 Drawing and Product References.	F. 42—Component History Card. F. 48—Assembly List. F. 66—Component Pattern Register.

F. 42—Component History Card.

PAGE	FORM
II B. 87 Design.	F. 40—Component Design Comparison Sheet. F. 41—Component Register. F. 43—Product Complaints Report. F. 48—Assembly List. F. 109—Works Product Finished Weight Card.

F. 43—Product Complaints Report.

PAGE	FORM
I B. 25 Sales Committee. II B. 97 Design. IV D. 317 Identification of Works Product.	F. 42—Component History Card. F. 83—Acknowledgment of Goods Received. F. 107—Progressive No. Register.

Series...../.....					
Part No.	Name.	Design Class.	Part No.	Name.	Design Class.
00			50		
01			51		
02			52		
03			53		

F. 41
Component
Register.

This is a register from which Part Nos. are taken as required. The plan is for a series No. to be adopted for each year, thus 13 for 1913, followed by serial Nos., commencing at 1 each year. The form is drawn for one hundred numbers per sheet, thus allowing the last two digits to be printed throughout. If the Part No. is not synonymous with the Drawing No., a column requires to be added for giving the latter. The need for a Design Class Reference depends on the manner of filing the Component History Cards (see below). The register sheets are made in the first instance on paper suitable for obtaining photo-prints of same size as Assembly Lists (F-48) for supplying copies to Works Office, Work Depot, etc.

F. 42
Component
History Card.

Name.....		Design Class No.....							
	Part No.	Notes.	Mat'l.	Fin'd Weight.	USED ON			Alleged Faults.	Instructions.
					Type of Product	As-sembly Drawing.	As-sembly List.		
Designed									
Date									
Modified									
Date									

This card is arranged to serve as a name index under the specific Design Class No. This brings together all components of similar description, whereas alphabetical sequence is very liable to prove misleading. To locate more readily the groups of similarly-named components, the class Nos. may be subdivided. A further point is that the classification may be largely independent of names or purpose of parts, e.g. bushes of all kinds. The Component Register given above provides the necessary cross-reference to this classification. Provision is made for indicating the change of Part No. consequent on any modification of the original design. The association of these modifications on one card is invaluable for specifying correct replacements of superseded designs. Provision is also made for recording faults as reported from the Manufacturing or Repairs Dept., and instructions as to future orders or as to part to be used on repairs. Size of card may be 5" x 8", with continuation cards hinged by linen strip on the bottom edge of the card—giving the whole record without turning over. The finding of cards will be facilitated by having a tab projection at the top of each, on which the type of product or other convenient key reference is indicated.

F. 43
Product
Complaints
Report.

Date.....					
Type of Product.	Progressive No.	Customer.	Part No.	Name of Part.	Complaint and Remarks.

These reports will be sent to the Drawing Office by the Repairs Dept. as to work actually examined, and possibly made out in the Drawing Office as to complaints by post from customers, though an independent office is preferable. The particulars as to Part No. may have to be deduced from the information available—a straightforward matter if the Progressive No. is quoted. Size of form may be 5" x 8".

CROSS REFERENCES.

F. 44—Print Index Card.

PAGE
II B. 103 Shop Prints.

FORM
F. 6—Correspondence Index Card.
F. 7—Illustrations Register.
F. 45—Print Delivery Ticket.

F. 45—Print Delivery Ticket.

PAGE
II B. 103 Shop Prints.

FORM
F. 44—Print Index Card.
F. 46—Print Recall Slip
F. 48—Assembly List.
F. 52—Individual Order Production Chart.
F. 90—Print Loan Slip.

F. 46—Print Recall Slip.

PAGE
II B. 104 Shop Prints.

FORM
F. 45—Print Delivery Ticket.

*F. 47—Drawing Summary.**(Design Summary.)**(Print Summary.)*

PAGE
II B. 99 Component Schedules.
II B. 104 Shop Prints.
IV C. 289 Stock Classification.
IV D. 317 Identification of Works Product
IV E. 324 Final Records.

FORM
F. 48—Assembly List.
F. 49—Production Instruction.
F. 50—Erecting Specification Card.
F. 52—Individual Order Progress Chart.
F. 53—Quantity Slip.
F. 100—Work Tally (Machining Sub-Order).
F. 101—Assembling Sub-Order.
F. 102—Erecting Sub-Order.
F. 107—Progressive No. Register.

Drawing No.					
Sent to	Date Issued.	Date Re-called.	Sent to	Date Issued.	Date Re-called.

This card is arranged to provide a record of all prints issued of any drawing. Similar cards of distinctive colours are advisable for issues to Works, to Suppliers for purchasing purposes, and to prospective Customers. A line entry is necessary for each print, and the recall should be noted and re-entry made when prints are only temporarily recalled. Size of form may be 4" x 6".

F. 44
Print Index
Card.

Separate line for each copy. Drawing No.					
TITLE					
A.U. Ref.					
Date Issued.	For Order No.	Dept.	Received by	Date Returned	Recall Ticket.

This ticket serves as a delivery ticket of prints issued to the Works. The tickets are arranged in book form for a carbon copy to remain, on which Works Office will initial for receipt. The ticket is then filed as an index card of prints in Works. Identical tickets of distinctive colour will serve as between Works Office and Works Drawing Stores, or possibly Pattern Shop.

F. 45
Print Delivery
Ticket.

Similar cards may be used for Assembly Lists. Size of form may be 2½" x 3½", printed four deep, with fast carbon copy.

Ref. No.	
Date	Drawing No.
TITLE	
Order No.	
Reason of Recall.	Authorised.
Estimated Time of Re-issue.	
Copies to be returned	1 2 3 4 5 6 7
Received back by	

These tickets are dealt with after the same manner as Print Delivery Tickets, as between Drawing Office and Works Office, and again as between Works Office and Works Department. The routine tends to check inconsiderate recall by the D.O., and helps to remind that the recall of drawings suspends production. After recall is entered on the Print Delivery Ticket (Works Office Copy), the Recall Ticket is sent to View Room to hold against return of print.

F. 46
Print Recall
Slip.

Size of form may be 2½" x 3½", printed four deep, with fast carbon copy.

General Description.		Title.
Assembly Unit.	Assembly Drawing.	
A.U.		

Type Ref.	Design Index No.
Code Word.	Gen. Arrangement Dwg.

F. 47
Drawing
Summary.

Units per complete product.	Office Order No. Quantity.	Progressive Nos. Name Plates. Inspection. Instructions. Delivery.

These summaries are essentially lists of assembly drawings pertaining to each order. Where designs are repeated at all, the summary can be on paper suitable for blue-printing, with a space blocked out (shaded in illustration) for those particulars that vary for each order. A Design Index No. is given to each complete design or specific combination of Assembly Units, and the least variation in design, as between one order and another must involve a new Index No. This has the effect incidentally of emphasising that much so-called repetition work is not strictly repetition.

CROSS REFERENCES.

F. 48—Component Assembly List.
(Component Schedule.)

PAGE	FORM
II n. 96 Drawing and Product References.	F. 39—Standard Fittings Sheet.
II n. 99 Component Schedules.	F. 41—Component Register.
II c. 109 Pattern Marks.	F. 42—Component History Card.
IV n. 279 Purchase Requisitions.	F. 45—Print Delivery Ticket.
IV c. 309 Component Stock.	F. 47—Drawing Summary.
	F. 49—Production Instruction.
	F. 50—Erecting Specification Card.
	F. 52—Individual Order Progress Chart.
	F. 53—Quantity Slip.
	F. 59—Tool Order.
	F. 66—Component Pattern Register.
	F. 69—Casting Instruction.
	F. 100—Work Tally (Machining Sub-Order).
	F. 101—Assembling Sub-Order.
	F. 104—Work Depot Production Programme.

F. 49—Production Instruction.

PAGE	FORM
I A. 12 Production Programmes.	F. 12—Office Order—Sales or Production.
II F. 146 Sub-division of Production Orders.	F. 47—Design Summary.
II G. 167 Rejection Routine.	F. 48—Assembly List.
IV D. 316 Warehouse Functions.	F. 50—Erecting Specification Card.
IV D. 320 Sales Order Routine.	F. 52—Individual Order Production Chart.
IV D. 321 Sales Order Routine.	F. 69—Casting Instruction.
	F. 77—Forging Delivery Sheet.
	F. 104—Work Depot Production Programme.
	F. 106—Departmental Memorandum.
	F. 159—Foreman's Requisition.

101				Set.....		Assembly Drawing No.		Assembly Unit.		F. 48 Component Assembly List.
				Sheet.....				A.U.		

Quantity Slip Superimposed here.	Line No.	Detail Dwg. No.	Part No.	Standard Fittings Ref.	Pattern Mark.	Name of Part.	Material.	Purchase Specn. No.	No. per Assembly Unit.					
									Castings.	Forgings.	Stamp- ings.	From Bulk.	Bought Finished.	
	1			S.F.										
	2													
	3													

This list is intended for reproduction by photo-printing, and the information on each sheet is permanent to the respective A.U. References, any change whatever in detail involving a new list under a new A.U. Ref. The serial Nos. printed on each sheet are for purposes of correctly pairing with the Quantity Slips, and provides a convenient reference for filing the original sheets. Space is provided for marking the number of sheets making up the set for the respective A.U. Ref., thus 1, 2, 3, 4 and underneath is written the sheet No. in question, *e.g.* 3. The Detail Dwg. No. will not usually be quoted if the component drawings are in unit form, bearing only the Component or Part No. The Standard Fittings Reference will only arise for details not bearing a Part No. Such items may be conveniently considered by the Drawing Office as bought finished, the question of whether same have to be made specially or bought specially or taken from stock being left for settlement in the Works Office in making up the Quantity Slips. In the matter of Pattern Mark, this will only arise where components of a given Part No. are derived, as to casting or stamping, from a pattern bearing another Part No. The original Part No. is then quoted, with X prefixed, as the Pattern Mark (see discussion). A column is provided for entering the Purchase Specification No. appropriate to the material to be used. This allows of the maximum refinement in specifying material without loading the Assembly List. The arrangement shown for entering quantities per Assembly Unit under the headings of Castings, Forgings, etc., facilitates the use of the lists by Pattern Shop, Smithy and other Works Departments. The column headed "From Bulk" has reference to items made from bulk material, such as Metal Bar, Sheet or Tube, Timber, Fibre, etc. Line Nos. are printed in to obviate errors in reading the Quantity Slips, which are attached in the Works Office to each Assembly List Sheet.

Size of form may be one-eighth Double Elephant Paper size, 9½" x 13", or thereabouts, to conform with a standard detail drawing size. While this size is a little large for office use, it allows more Assembly Units to be listed on single sheets, and is convenient for mounting as a shop drawing for loan to Fitting Shop—the Quantity Slip being omitted from such prints.

F. 49
Production
Instruction.

No.....Date.....Office Order No.

Short Particulars.

Issued to Depts.....Signed.....Passed.....Wks Mgr.....

These instructions are typewritten in the Drawing Office for issue to Works Office, Inspector, etc., and deal with matters outside the range of Assembly List, Design Summary or Erecting Card. Also used when a Sales Order Ref. is used as a Production Order No. (letter P added). It may be used for advance instructions to Pattern Shop, and contain sketches. Size of form same as Office Order

CROSS REFERENCES.

*F. 50—Erecting Specification Card.**(Erecting Card.)*

PAGE	FORM
II B. 100 Component Schedules.	F. 12—Sales Order.
IV D. 319 Final Inspection.	F. 47—Design Summary (Design Index)
IV E. 324 Final Records.	F. 48—Component Assembly List.
VI E. 524 Rating of Finished Stock Products.	F. 49—Production Instruction.
	F. 99—Inspection Certificate.
	F. 102—Erecting Sub-Order.
	F. 107—Progressive No. Register.

*F. 51—Sales Sundries Order Specification.**(Sales Repair Order.)*

PAGE	FORM
I A. 11 Production Programme.	F. 12—Office Order—Sales.
II B. 101 Component Schedules.	F. 13—Acknowledgment of Sales Order.
IV C. 310 Component Stock.	F. 54—Purchase Requisition.
IV C. 312 Issue of Stock.	F. 83—Acknowledgment of Goods Received.
IV D. 321 Sales Order Routine.	F. 106—Warehouse Memorandum.
	F. 112—Packing Slip.

Date Card issued.....Office Order No.....			Date Work due.....Item No.....		
Short Particulars.			Type of Product.		Design Index No.
Assembly Unit. A.U.	Description.				No. of Units per complete product.
Extras.					
Style of Finish.	Name Plate.	To be finally inspected by			
Erecting Sub-Order.	Progressive No. appropriated.	Works Inspection Certificate No.	Date	Packed by	

F. 50

Erecting
Specification
Card.

These cards constitute erecting specifications appropriate to the respective Sales Orders. The Design Index No. may only hold good as to combination of assembly units, provided that the extras enumerated may be added at the erection stage. Variations from standard that affect the assembly units are considered as an integral part of the design, and will not figure as "extras" on these cards. Where a Sales Order calls for more than one complete product, the Erecting Card for each item is identified by numbering with the consecutive No. and the total quantity, thus 3/12 would mean the third item out of twelve required. In certain circumstances this may serve as a Progressive No., but if the product (without extras) is obtained from stock, i.e. made under a Stock Manufacturing Order, there will be an independent progressive No., which will be appropriated when the Erecting Sub-Order is issued. An Erecting Sub-Order can, if need be, cover more than one item on a Sales Order, though separate Erection Cards are necessary for accompanying each item to inspection.

Customer.				Customer's Ref.		Date.		Order No.		
Parts to be marked.		Inspector.		For Despatch with		Shipping Marks.		Date due.		
Quantity.	Description.	Part No.	Mater- ial.	Pur- chase Req'n.	Purchase Order.			Warehouse Memo.		Item ready.
					Ref.	Date	Supplier.	Ref.	Date.	

F. 51

Sales Sundries
Order
Specification.

Specification issued byGoods inspected by.....Packed by.....

These specifications are advisedly made out in the Drawing Office from the Customer's instructions for issue to the Warehouse. The specification constitutes the official order. The Warehouse hold a certain stock of spare parts for filling these orders, and issue Warehouse Memos. to Works Office for parts required to complete. The Drawing Office may possibly issue the Purchase Requisition for goods that have obviously to be bought specially, and by entering the Purchase Requisition No. before issuing the specification, overlapping and misunderstanding is obviated. The Warehouse are responsible for collecting the goods. Size of form should correspond with Office Order

CROSS REFERENCES.

*F. 52—Individual Order Progress Chart.**(Production Schedule.)*

PAGE		FORM	
I B. 23	Production Committee.	F. 12—	Office Order—Sales or Production
II F. 146	Sub-Division of Production Orders.	F. 45—	Print Delivery Ticket.
II F. 150	Progressing and Work Depot Routine.	F. 47—	Design Summary
IV B. 279	Purchase Requisitions.	F. 48—	Component Assembly List.
IV C. 310	Issue of Stock.	F. 49—	Production Instruction.
		F. 53—	Quantity Slip.
		F. 54—	Purchase Requisition.
		F. 55—	Stock Appropriation Ticket.
		F. 58—	Tools Provided Schedule.
		F. 59—	Tool Sub-Order.
		F. 69—	Casting Instruction
		F. 71—	Casting Delivery Sheet.
		F. 77—	Forging Delivery Sheet.
		F. 80—	Purchase Delivery Reminder Card
		F. 81—	Purchase Order Endorsement.
		F. 82—	Goods Received Note
		F. 94—	Completed Tool Advice.
		F. 99—	Inspection Certificate.
		F. 100—	Work Tally (Machining Sub-Order).
		F. 101—	Assembling Sub-Order.
		F. 102—	Erecting Sub-Order.
		F. 103—	Daily List of Sub-Orders Issued.
		F. 104—	Work Depot Production Programme
		F. 106—	Departmental Memorandum.
		F. 108—	Works Product Note.
		F. 112—	Packing Slip.

Date of Order.....Office Order No.....							
Customer or Account				Short Particulars			
Deliveries entered in red. → Indicates completion of any stage.							
STAGE.	Notes.	Week.	Week.	Week.	Week.	Week.	Week.
DRAWINGS Requirements	F 106						
ASSEMBLY LISTS Date received	45						
DESIGN SUMMARY " "	48						
DESIGN SUMMARY " "	47						
MATERIALS Purch. Requisitions	54						
Deliveries	82						
Stock Appropriation	55						
PATTERNS New Patterns	49						
Casting Instructions	69						
CASTINGS Requirements	53						
Deliveries	71						
FORGINGS Requirements	53						
Deliveries	77						
JIGS AND SPECIAL TOOLS Tools Provided	58						
Schedules	59						
Tool Sub-Orders	94						
Deliveries							
MACHINING Sub-Orders	103						
Deliveries	100						
ASSEMBLING Sub-Orders	101						
Deliveries	99						
ERECTING Sub-Orders	102						
Deliveries	99						
COMPLETION Due	12						
Deliveries to							
Warehouse	108						
Stock Appropriation	55						
Despatch	112						

This sheet is arranged to present a general summary of the position of an order at all times. Beyond that, it constitutes a record of the original planning of the due dates for each stage, having regard to the commitments and possibilities of each department for the respective weeks. The columns provided for the weekly expectations and realisations may be headed with a week No. or date of week ending. The sheet aims to present a true picture of the position from week to week, and to help prevent any stage being overlooked or unduly delayed. In the column headed "Notes" form references have been put in for the purpose only of explanations indicating the source of the information requisite to complete the records for each stage. The amount of detail that should be entered will depend on the conditions of the work. In some cases ticks to represent each item will be sufficient, with a cancelling stroke for deliveries. Drawing requirements refer to due dates agreed with Works Office by the Drawing Office. Size of form will depend on number of weekly columns to be provided.

CROSS REFERENCES.

F. 53—Quantity Slip.

PAGE	
II B. 100	Component Schedules.
II C. 108	Orders for Castings.
IV B. 279	Purchase Requisitions.
IV C. 309	Component Stock.
IV C. 312	Issue of Stock.
IV C. 313	Returns from Shop.
VI B. 474	Cost Allocation Routine.

FORM	
F. 12	—Office Order—Production.
F. 47	—Design Summary.
F. 48	—Assembly List.
F. 52	—Individual Order Progress Chart.
F. 54	—Purchase Requisition
F. 55	—Stock Appropriation Ticket.
F. 56	—Reserve Stock Control Card.
F. 59	—Tool Order
F. 69	—Casting Instruction.
F. 86	—Goods Issue Voucher.
F. 100	—Work Tally (Machining Sub-Order)
F. 101	—Assembling Sub-Order.
F. 104	—Work Depot Production Programme.

F. 54—Purchase Requisition.

PAGE	
II E. 141	Tool Provision.
II F. 151	Progressing and Work Depot Routine.
IV B. 276	Purchase Specifications.
IV B. 279	Purchase Requisitions.
IV B. 280	Purchase Orders.
IV C. 298	Rejections and Replacements.
IV C. 301	Stock Control.
V J. 413	Control of Repair Expenditure.
VI B. 453	Material Allocation.

FORM	
F. 14	—Price Enquiry.
F. 15	—Purchase Order.
F. 51	—Sales Sundries Order Specification
F. 52	—Individual Order Progress Chart.
F. 53	—Quantity Slip.
F. 59	—Tool Order.
F. 68	—Cross Index Sheet
F. 69	—Casting Instruction.
F. 96	—Plant Order
F. 159	—Foreman's Requisition.

101						Assembly Unit. A.U.		Office Order No.				
Line No.	Total Re- quirements (Finished).	Margin (Material).	Stock Approp- riation.		Net Balances (Material).	Process Products	Bulk Material.		Purchases.			Date Material Avail- able.
			Ticket No.	Quan.			Requirements.	Reqn. No.	Date.	Deliveries Specified.		
1												
2												
3												

F. 53

Quantity

These slips are made out by the Works Office (Production Section) in conjunction with the Design Summary (F 47) and Assembly Lists (F 48) supplied by the Drawing Office. The slips are superimposed on the Assembly Lists, the list and slip being numbered to facilitate pairing. There may be several slips for as many orders associated with the same Assembly List. Provision is made for specifying a margin of material to be put in hand with the actual requirements. This may be charged up to the order, but will be subject to control as reserve stock, from which appropriation will be made for replacements. The provision on the form for Stock Appropriations is to meet the case where a certain amount of material is already on hand. The column for Process Products is provided for indicating that the material requirements will be met in this way, viz. as castings, forgings or stampings. Bulk Material refers to bars, tubes, sheets and the like. The Purchase entries will have reference to materials requisitioned under the Office Order No. given. The date that material is available will be filled in by the General Stores as each item is completed as to material. Copies of these slips are supplied with the respective Assembly Lists to the manufacturing departments as well as to the General Stores and Work Depot, supplemented by Casting Instructions (F 69) from the Pattern Shop to the Foundry. Size of form to suit Assembly List.

			Date.		Requisition No.	
Purpose.			Part No.		Office Order No.	
Quantity.	Description.	Approx. Value.	Purchase Specification.		Delivery Requirements	
Dept. to whom goods are to be issued.			Certified.		Approved.	
Purchase Order No.	Date.	Supplier.				
			Works Office.		Works Manager.	

F. 54

Purchase
Requisition

These requisitions are made out in carbon triplicate by the Works Office (Production Section), and, after approval by the Works Manager, the top copy is sent to the Buyer and the second copy to the General Stores. The General Stores may be required to confirm on each order that the required goods are not available from stock or from stock material on order. If the Drawing Office make out any requisitions, the General Stores copy must be first sent to the Works Office (Production Section) for noting on Quantity Slips and Progress Chart (Form F 52). In any case the latter office should be consulted by Drawing Office as to delivery requirements. Requisitions for Tool and Plant purchases of ordinary items may be initiated by Tool Stores Chargehand, and the more special items requisitioned by the Works Office (Ratefixing Section) under direct instruction from the Works Manager. Size of form may be 6 1/2" x 8".

CROSS REFERENCES.

F. 55—Stock Appropriation Ticket.

PAGE	FORM
I A. 10 Production Programme.	F 52—Individual Order Progress Chart.
II F. 154 Progressing and Work Depot Routine.	F. 53—Quantity Slip
IV C. 300 Stock Control.	F. 86—Goods Issue Voucher.
IV C. 310 Issue of Stock.	F. 89—Stock Control Card (General and Component)
IV D. 322 Warehouse Requisitions.	F 98—Viewing Report
	F. 110—Warehouse Stock Control Card.

F. 56—Reserve Stock Control Card.

PAGE	FORM
II F. 150 Replacement of Defective Work.	F 53—Quantity Slip.
II F. 151 Progressing and Work Depot Routine.	F 57—Application for Stock Production Sanction.
II F. 154 Progressing and Work Depot Routine.	F. 86—Goods Issue Voucher
IV B. 279 Purchase Requisitions.	F. 89—Stock Control Card (General and Component).
IV C. 298 Rejections and Replacements.	F. 110—Warehouse Stock Control Book.
IV C. 300 Stock Control.	
IV C. 309 Component Stock.	
IV C. 311 Issue of Stock.	
IV D. 318 Warehouse Stock Control.	
V G. 371 Functions of Stock Accounts.	
VI E. 522 Stock Production Sanctions.	

F. 57—Application for Stock Production Sanction.

PAGE	FORM
I A. 9 Production Programme.	F. 12—Office Order—Production.
I C. 39 Construction of Estimates.	F. 56—Reserve Stock Control Card.
II F. 146 Sub-division of Production Orders.	F. 106—Warehouse Memorandum.
IV B. 278 Purchase Requisitions.	
IV C. 319 Component Stock.	
IV D. 316 Warehouse Functions.	
IV D. 318 Warehouse Stock Control.	
V H. 391 Preparations for Stocktaking.	
V H. 397 Valuation of Component Stock.	
VI E. 521 Stock Production Sanctions.	

F. 56
Reserve Stop
Control Car

These cards are made up in the Works Office (Production Section), and control the use of the margins or reserves of components allowed on the various orders (see Quantity Slip, f 53) whether a Stock Manufacturing Order or not. The product of Stock Manufacturing Orders is also dealt with on these cards. In the case of stock held in the Warehouse, a separate set of these stock control cards may be kept up there as well as in the Works Office. The routine allows every freedom in appropriation, and any adjustment found necessary in the cost allocation is easily effected from the respective Goods Issue Voucher. The Ordering Level is a question of how low the unappropriated balance may fall before applying for further sanction to manufacture for stock. The probable demand may vary enough to make a fixed ordering level misleading. Size of form may be 5" x 8". Distinctive colours are necessary for finished and rough components.

F. 57
Application
for Stock
Production
Sanction.

CROSS REFERENCES.

*F. 62—Job Investigation Report.**(Job Efficiency Report.)*

PAGE	FORM
II D. 136 Job Appeals and Investigations.	F. 58—Operation and Tools Provided Schedule.
V R. 356 Individual Statistics.	F. 61—Job Record Sheet.
	F. 65—Plant Efficiency Report.

F. 63—Component Cost Comparison Card.

PAGE	FORM
I C. 41 Construction of Commercial Estimates.	F. 61—Job Record Sheet.
II F. 149 Sub-division of Production Orders.	F. 109—Works Product Finished Weight Card
IV B. 276 Purchase Specifications.	F. 128—Finished Component Rate Card.
VI B. 465 Cost Allocation Requirements.	
VII R. 525 Rating of Finished Stock Products.	
VII G. 565 Nature of Cost Returns.	

Time in minutes per piece.				Average Time Exceeded.		Week Ending.		Dept.	
Man's No.	Machine No.	Sub-Order.	Part.	Qnan.	Time Taken.	Lowest Record.	Average Time.	Investigator's Report.	

F. 62

Job Investigation Report.

These are made out weekly in the course of making up the Job Record Sheets. No particular space is indicated on the latter for entering the average times, as a pencil entry is assumed below the job entries. The Assistant Works Manager might very well be the investigator in this connection, reporting to his chief in the space provided. Investigation should be conducted in a comprehensive way, so as to bring out the fairness of time limit, efficiency of machine, of shop service, etc. Forms identical with this, with a suitable endorsement, may be used for reported new records in the way of improved performances. This course serves to confirm the correctness of the record thus set up, and to call attention to good workmen. Size of form may be 10" x 8", with widely spaced horizontal lines to give room for report.

All figures are per piece.				Type of Product used for.		Drawing No.		Part No. or Design Ref.	
----------------------------	--	--	--	---------------------------	--	-------------	--	-------------------------	--

F. 63

Component Cost Comparison Card.

Description.									
Material.	Form.	Weight.	Rate.	Cost.	Rate.	Cost.	Rate.	Cost.	
Sub-Order No.									
Quantity									
Ref. No.	Operation.		Wages Cost.	Shop Charges.	Wages Cost.	Shop Charges.	Wages Cost.	Shop Charges.	
Total Works Cost per piece		

These cost cards are intended to be made up in the Works Office (Ratefixing Section), and are quite apart from the Works Accounts proper. The information as to material will be based on enquiry and verification of weights. By "Form of Material" is meant whether casting, forging, or bulk material. In the latter case, dimensions may be inserted, just as the Purchase Specification Ref. may be added, if this card is to serve as a reference card to the Production Section. The particulars of Wages Cost and Shop Charges are derived from the Job Record Sheets. The Total Works Cost is made up of the total material cost, wages cost and shop charges. In the case of finished components passed into stock, the Works Accounts Office will prepare a Finished Component Rate Card.

CROSS REFERENCES.

F. 64—Plant Record Card.

PAGE		FORM	
II A. 84	Plant Lay-out.	F. 65	—Plant Efficiency Report.
II D. 116	Preliminaries to Production Estimating.	F. 96	—Plant Order.
II D. 122	Tabulation of Production Data.	F. 145	—Buildings and Fixed Plant Register.
V J. 399	Plant Records.	F. 158	—Plant Stoppage Report.
V K. 425	Valuation of Buildings and Fixed Plant.	F. 159	—Tool Order.
VI F. 546	Apportionment of Departmental Oncosts to Individual Producing Units.		

F. 65—Plant Efficiency Report.

PAGE		FORM	
II D. 116	Preliminaries to Production Estimating.	F. 58	—Tools Provided Schedule.
II D. 122	Tabulation of Production Data.	F. 62	—Job Investigation Report.
V J. 409	Control of Capital Expenditure.	F. 64	—Plant Record Card.
V J. 414	Control of Repair Expenditure.	F. 96	—Plant Sub-Order.
		F. 158	—Plant Stoppage Report.
		F. 159	—Foreman's Requisition.

				Class of Plant.		Plant No.	
Maker..... Description.....				Accessories bearing same Plant No. Lifting Tackle Tons.	Maximum Dimensions of Work.	Location.	
						Date.	Dept.
Cardboard Outline Plan to Scale.				Kind of Foundation. Belt, Length and Section. Angle of Belt with ground. H.P. Transmissible.		Speeds and Feeds.	
						Investiga- tions of Actual Power Consump- tion.	
Reverse Side.				Repairs.			
Date New.....Original Value				Plant Order No.	Date.	Particulars.	Cost (if over £1).
Investigated Values.			Basis of Machine Rate.				
Date.	By.	£	Building Service. Power Service. Producing Unit Service. Tool Service Material Service, Deptl. Administration,, Contingency ,,				

F. 64

Plant Record
Card.

This card is intended to give the information requisite for Works Management purposes. The Works Office (Ratefixing Section) can best make up and hold these cards. The cardboard outline plan is for scheming new arrangements of machines. The details provided on the back of the card are of secondary importance to the Works. Investigated Values refer to actual valuation carried out by the Works as distinct from book values arrived at by arbitrary depreciation percentages. The Machine or Producing Unit Rate details indicated require to be considered in connection with the discussion on page 544. The entries as to Repairs will be derived from the copies of Plant Orders (Form 96). To minimise the clerical work, the cost figures are only reported by the Works Accounts Office when in excess of £1, or other suitable limit. Size of form may be 5" x 8"

		Date.	Dept.	Plant No.
Short Description.				
Age of Plant in question.....Operator's Wages Rate.....Principal Work.....				
Report.			Signed.	Date.

F. 65

Plant
Efficiency
Report.

This form is used for reporting observed defects in construction and proposals for remedying same, for suggesting new tools and fixings or even new machines, and for reporting generally on any plant matter. The reports are sent in the first instance to the Works Manager, who gets supplementary reports or comments from others as seems necessary. They may be vplunteered by Foreman, Ratefixer, Tool Designer or other competent observer. Reports are requested when extensive repairs are contemplated. Size of form same as Plant Record Cards (above).

CROSS REFERENCES.

F. 66—Component Pattern Register.
(Pattern Mark Register.)

PAGE
 II B. 94 Drawing and Product Refer-
 ences.
 II c. 109 Pattern Marks.
 VI D. 512 General Costs—Brass Foundry
 (Grade Marks).

FORM
 F. 41—Component Register.
 F. 48—Component Assembly List.
 F. 67—Pattern Tracing Card.
 F. 88—Timber Ticket.

F. 67—Pattern Tracing Card.

PAGE
 II c. 107 Pattern Records.

FORM
 F. 66—Component Pattern Register.
 F. 68—Cross Index Sheet.
 F. 69—Casting Instruction.
 F. 70—Pattern Recall Slip.

Part No.	Short Description.	Drawing No.	From Existing Pattern.		Office Order.	Made by.					Date Finished.	Inspected and Passed by.	Tracing Card made out.	Grade Mark.
			Pattern Mark.	Alterations.		Check No.	Rate.	Time Limit.	Time Taken.	Timber Ticket No.				
0														
1														
2														

F. 66
Component
Pattern
Register.

This register serves for recording patterns made under and bearing Part Nos. in raised figures. As brought out in the discussion, when such patterns are applied to a second Part No., the original Part No. on the pattern is prefixed with X, and becomes then a Pattern Mark. The terminal numbers 0-9 are printed on the sheets, two or three sets often appearing on the one sheet. This facilitates entries in any sequence. Part Nos. having no reference to castings will, of course, never be filled in. A register in closely similar form will serve as a Pattern Mark Register, the consecutive Nos. being taken up by the Pattern Shop Foreman as occasion requires. The alterations to any patterns for successive office Orders are best noted on the Pattern Tracing Card (F 67), whether Pattern Mark is varied or not. Grade Mark refers to marks applied to patterns to indicate the grade of casting called for by the method adopted for pricing the casting. The point is discussed further under Brass Foundry. The reference to Time Limit assumes that the Pattern Shop Foreman is entrusted with the ratefixing requisite for applying the premium system in the dept. A separate set of records in card form may be preferred for job data of this nature. An independent ratefixer will be better in principle. The Timber Ticket Ref. ensures the timber, etc., used being allocated for each pattern. Size of book may be 13" x 8"—the horizontal lines should be widely spaced.

IN					Inside Brass.	Inside. Iron.	Outside Foundries.				OUT
							1	2	3	4	
Pattern Mark.					Pattern Mark.						

F. 67
Pattern
Tracing
Card.

Description										Pattern Out and use Ordered.						Returned.	
Class of Pattern Contraction										Date.	Ctg. Inst.	To make.	Date.	Ctg. Inst.	To make.	Date.	Location Ref.
Made for Office Order.	Date.	Dwg No.	To make.	Core boxes.	Extra pieces.	Ctgs. per mldg.	Pieces per Ctg.										
Marks Added.	Alterations.																

This card is printed on each side, and is designed with one corner cut off. The front and reverse printings are shown above side by side. The front side (left hand) bears IN in plain letter on the left-hand corner, while the reverse side bears OUT in right-hand corner. The scheme is for the cards to be reversed and show OUT—hence the cut corner—when the pattern is out. By the use of signals along the top edge of the card, when in the OUT position, it will be obvious which patterns are lying at a given foundry, "Inside" being synonymous with Works or Own Foundry. The Pattern Mark may be a Part No., and it will, except for secondary applications for Part No. pattern, be unnecessary to fill in column "To make." The Location Reference is the storage place of the pattern, and provision is made for noting altered Location Ref. as often as may be necessary. The entries of all the Casting Instructions for which pattern is used, supplementing same with the Office Order No., if need be, is likely to prove a very useful index. Size of form may be 4½" x 4½"—reverse or "OUT" side being printed in red.

CROSS REFERENCES.

F. 68—Cross Index Chart.

PAGE	FORM
II C. 106 Pattern Storage.	F. 15—Purchase Order.
II C. 108 Orders for Castings.	F. 54—Purchase Requisition.
IV C. 304 Sub-Stores.	F. 67—Pattern Tracing Card.
V J. 404 Building and Fixed Plant Identification.	F. 69—Casting Instruction.
VI D. 511 General Costs—Iron Foundry.	F. 109—Works Product Finished Weight Card.

F. 68

Cross Index
Chart.

Series Range..... 00- 99										
	0	1	2	3	4	5	6	7	8	9
00										
10										
20										
30										
40										
50										
60										
70										
80										
90										
	0	1	2	3	4	5	6	7	8	9
Continuations as indicated										

This form is introduced here in view of the probable necessity for the Pattern Store Attendant to have a handy index to pattern locations under Pattern Mark references, without referring to the Pattern Tracing Cards. Each sheet is ruled to give 100 spaces, and each sheet can be applied to any range of one hundred Pattern Marks (from 00 to 99) by merely marking at the head of the sheet the range in question. The continuation spaces at foot of sheet allow for overflow cases from the proper squares.

This sheet may be found useful in the General Stores as a cross index to Casting Instructions under Pattern Mark References.

Other applications of this sheet are as a cross index to Purchase Orders under Purchase Requisition References and *vice versa*, and for graphically indicating the receipt of the complete range at the General Stores of each series. This latter function can be usefully utilised in various directions as a safeguard against the miscarriage of any numbered series.

Another application of this sheet is for entering up fortnightly consumption of various shop supplies as issued by the Tool Stores. In that case a set of sheets is appropriated to each kind of supply, and each sheet gives a range of one hundred Check Nos. The feature of this application is its simplicity and semi-graphic result. Size of form may be 13" x 8"—printed one side only, and preferably red ink.

CROSS REFERENCES.*F. 69—Casting Instruction.*

PAGE
II c. 107 **Pattern Records.**
II c. 108 **Orders for Castings.**

FORM
F. 15—Purchase Order.
F. 48—Component Assembly List.
F. 49—Production Instruction.
F. 52—Individual Order Production Chart.
F. 53—Quantity Slip.
F. 54—Purchase Requisition.
F. 67—Pattern Tracing Card.
F. 68—Cross Index Sheet.
F. 70—Pattern Recall Slip
F. 71—Casting Delivery Sheet.
F. 127—Rough Component Rate Card.

F. 70—Pattern Recall Slip.

PAGE
II c. 108 **Pattern Records.**

FORM
F. 67—Pattern Tracing Card.
F. 69—Casting Instruction.

							No.	Date.	Foundry.	Office Order No.	
Line No.	Pattern Mark.	To make.	Total Quan.	Metal Mixture.	Weekly Pattern Required	First Due Date.	Notes by Pattern Shop.	Pattern sent to Foundry this day.	Pattern in Foundry.	Special Moulding Boxes.	Foundry Notes.
									Office Order.	Ctg. Inst.	
1											
2											
3											

F. 69
Casting Instruction.

This sheet is arranged to serve as a daily summary of all patterns sent to the Foundry under the respective Office Order Nos. A sheet for miscellaneous orders may be necessary, in which event the Order No. would appear under "Notes by Pattern Shop." Distinction is necessary in making out these sheets as to the foundry concerned. If an Outside Foundry is in question, the sheet will be passed through the Works Office (Production Section) to the General Office (Buying Section), serving all the functions of a Purchase Requisition (F 54), and then sent with the Purchase Order. The sheets are made out by the Pattern Shop Foreman in triplicate, one copy passing to the Pattern Stores temporarily for delivering the patterns, one copy to Foundry concerned, and one copy to Works Office (Production Section), who duly note on Quantity Slip and pass on to General Stores for receiving purposes. The information as to delivery requirements are obtained from the Quantity Slips (F-53), of which the Foundry may, or may not, have a copy—the Casting Instruction being quite sufficient, except that it does not inform the Foundry of work ahead, for which patterns are not ready or not notified as ready. The "Notes by Pattern Shop" may state when specially finished castings are required. The Foundry may mark off deliveries on these sheets or on back of Quantity Slips—the latter course gives a better survey of the position of the order generally. The label affixed to the respective patterns should quote the Casting Instruction No. in conjunction with the Line No., Office Order No., and date of Instruction. The quantities to be made at one time will be settled by the Foundry Foreman, according to his delivery instructions and shop conditions. The provision of suitable foundry flasks or moulding boxes for each item will have to be arranged for by the Foundry Foreman, and should be looked into as each casting instruction comes to hand to obviate delays. Size of form may be $6\frac{1}{2} \times 8$ ", distinctive sets of colours being used for Instructions to Outside Foundries, and possibly also as between Inside Iron and Inside Brass Foundries.

Date.....				
Pattern Mark.	Recalled off.			Reason of Recall.
	Office Order.	Casting Inst.	Date.	
Signed.....				
P.S. Attendant.		Pattern Shop Foreman.		

These slips are devised to regularise the return of patterns on the completion of an order and for intermediate purposes, such as alteration for another more urgent order. The slips are made out by the Pattern Stores Attendant, in duplicate, as to patterns unreturned on the closing of an order, and signed by the Foreman. In the case of recall for other reasons the Foreman will make out slip in triplicate, sending one copy to Foundry, one to Pattern Stores, and one to Works Office (Production Section). Size of form may be $2\frac{1}{2} \times 3\frac{1}{2}$ ".

F. 70
Pattern Recall Slip.

CROSS REFERENCES.

F. 71—Casting Delivery Sheet.

PAGE	FORM
VI B. 473 Cost Allocation Routine.	F 52—Individual Order Production Chart.
VI D. 513 Product Records—Foundry.	F. 69—Casting Instruction.
VI D. 517 Process Account Surveys.	F. 73—Foundry Daily Work Sheet.
	F. 76—Foundry Weekly Material Report
	F. 77—Forging Delivery Sheet.
	F 82—Goods Received Note.
	F. 86—Goods Issue Voucher.
	F 118—Process Product Summary
	F 126—Component Stock Ledger.
	F 127—Rough Component Rate Card.
	F. 129—Cost Allocation Card (1).

F. 72—Foundry Waster Ticket.

PAGE	FORM
VI D. 512 General Costs—Iron Foundry.	F 73—Foundry Daily Work Sheet.
VI D. 512 General Costs—Brass Foundry.	F 78—Smithy Daily Work Sheet.
VI D. 514 Product Records—Foundry.	F. 87—Shop Credit Slip
	F 98—Viewing Report.

F. 73—Foundry Daily Work Sheet (or Report).

PAGE	FORM
VI B. 473 Cost Allocation Routine.	F 26—Job Account Card.
VI D. 505 Process Cost Allocation	F. 29—Extra Pay Notification.
VI D. 514 Product Records—Foundry.	F 71—Casting Delivery Sheet.
	F 72—Foundry Waster Ticket.
	F 78—Smithy Daily Work Sheet.
	F 118—Process Product Summary.
	F. 127—Rough Component Rate Card.
	F 129—Cost Allocation Card (1).

							Foundry.	Date.	Ref.					
							C.D.							
Office Order No.	Casting Inst. Ref.	Pattern Mark.	Short Description.	Metal.	Quantity.	Grade Mark.	Total Weight in lbs.			Metal Charge.		Process Charge.		Goods Issue Voucher.
							Grades.			Rate.	Amt.	Rate.	Amt.	
							Intri- cate.	Aver- age.	Plain.					

F. 71
Casting
Delivery
Sheet.

These sheets are made out by the party inspecting the castings before these leave the Foundry. They are made in triplicate, the two carbon copies accompanying the castings to the General Stores, who, after confirming the weights, pass one copy on to the Works Accounts Office, where the metal and process charges will be extended. Separate sheets can be used for each Office Order in question or a number of orders may appear on one sheet. Provision is made for analysing the weights of castings under the several grades indicated. This may only be important in respect to the Brass Foundry output. The General Stores will make out a Goods Issue Voucher and send same to the Work Depot in respect to each lot of castings, unless instructed to accumulate same until specified quantities are reached. The Work Depot will, according to their requirements, utilise these vouchers for drawing the castings. The Inspector acting in the matter should sign each sheet. Similarly with castings received from outside foundries, in which case this sheet serves in lieu of the ordinary Goods Received Note (F 82). Separate sheets should be made for castings passing into stock as rough components. Size of form may be 6½" x 8", to correspond with Goods Received Note.

Pattern Mark.	Metal.	Casting Inst. No.	Office Order No.
Description.			Weight.
			lbs.
Nature of Fault.			Moulded by.
Estimated Material Loss (in value)			
" Process Charge			
" Wages			
" Shop Charges			
Date Signed			

Waster Tickets are made out in the Foundry by the Foreman, or by the Casting Inspector in respect to each casting found faulty before leaving the Foundry. The tickets are sent to the General Stores and passed thence to the Works Accounts Office. The estimated loss in respect to each waster may very well be computed by the party making out the ticket, as simple rules can be applied. The scrap metal is supposed to remain in the Foundry along with runners and the like. Castings rejected after leaving the Foundry are made the subject of Viewing Reports (F 98), and the scrap metal then passes to the General Stores to be charged out according as it is disposed of. Size of form may be 4" x 6".

F. 72
Foundry
Waster
Ticket.

Foundry										Date			
Check No.	Machine No.	Office Order.	Casting Instn.	Pat- tern	No. Made.	Time Taken	Wages.		Shop Charges.		Deliveries.	Waster Tickets.	
							Rate.	Amt.	Rate.	Amt.			

F. 73
Foundry's
Work Sheet

This sheet is made up each day by the Foundry Clerk, up to and including the column headed "time taken." Separate sheets are used for Moulding and Coremaking. In the case of the Brass Foundry, the "No. made" may refer to boxes moulded. Separate sheets are necessary in each case for castings passing into stock as rough components. The Moulding Sheets for the Iron Foundry are passed to the General Stores for marking off the castings delivered and Waster Tickets received, and to see that the whole number moulded are accounted for. The sheets then pass to the Works Accounts Office, who extend the wages and shop charges. Supplementary sheets are made out there for "extra pay" on the respective jobs. Size of form should agree with Form F 71.

CROSS REFERENCES.

F. 74—Foundry Mixture Card.

PAGE	FORM
VI D. 506 Metal Costs—Iron Foundry.	F. 75—Foundry Stock Control Book.
VI D. 509 Metal Costs—Brass Foundry.	

F. 75—Foundry Stock Control Book.

PAGE	FORM
VI D. 506 Metal Costs—Iron Foundry.	F. 74—Foundry Mixture Card.
VI D. 517 Process Account Surveys.	F. 76—Foundry Weekly Material Report.
	F. 89—Stock Control Card (General).

F. 76—Foundry Weekly Material Report.

PAGE	FORM
IV C. 302 Sub-Stores Organisation.	F. 71—Casting Delivery Sheet.
V G. 383 Stock Ledger.	F. 75—Foundry Stock Control Book.
VI D. 508 Metal Costs—Iron Foundry.	F. 82—Goods Received Note.
VI D. 511 General Costs—Iron Foundry.	F. 86—Goods Issue Voucher.
	F. 123—General Stock Ledger.
	F. 130—Cost Allocation Card (II.)— Stock Issues.

Date.....No.....				
Name of Mixture.		Symbol.		
This card supersedes Card No..... dated.....and the proportions given below must be strictly adhered to until further notice.				
Metal.	Brand	Charge.		
		Cwts.	Qrs.	Lbs.
Signed		Total		

F. 74
Foundry
Mixture Card.

These cards are for the instruction of the cupola or furnacemen. It will be the special care of the Works Chemist to issue new instructions as often as necessary, according as the metal supplies vary in analysis.

In the case of the Iron Foundry, the proportions of each charge being laid down, the iron stock records can be adjusted on the basis of the number of charges made. Size of form may be 4" x 6".

F. 75
Foundry Stock
Control Book.
 (Loose leaf.)

Date.	Mixture Card No.	No of Charges.	Brand.				Brand.				Scrap.							
			Used.		Received.		Balance.	Used.		Received.		Balance.	Weight Used.	Estimated Loss.	Outside Receipts.	From Day's Melt.	Approx. Balance.	
			Wt.	G.R.	Wt.	Wt.		Wt.	G.R.	Wt.	Wt.							

This book is kept by the Foundry Clerk and made up each day mainly from the Cupola Attendant's report of the number of charges melted of each specified mixture. The book can be applied to limestone, coke, etc. In regard to scrap, "Outside Receipts" will cover scrap castings received through the General Stores from the Shop, as well as scrap metal purchased. Each day's melt will show a difference representing additions to scrap stock and losses. The latter are estimated and the remainder is entered in the book as scrap received from Day's Melt. The balance thus arrived at can only be approximate, and must be subjected to scrutiny by estimate from actual inspection. Size of book to suit range of brands—intermediate short leaves will keep down the dimensions of the book.

F. 76
Foundry
Weekly
Material
Report.

FoundryDate.....									
Day.	No. of Melts.	Total Metal Melted.	Total Castings sent to Stores.	Metals Used.			Supplies Used.		
		Weight.	Weight.	Brand.	Ex. G.R.	Weight.	Kind.	Weight.	
Th.									
F.									
S.									
M.									
Tu.									
W.									
Total.				Estimated Loss.					

These reports are prepared by the Foundry Clerk, mainly from the Foundry Stock Control Book, and sent to the Works Accounts Office for allocation and survey purposes. Provision is made under "Ex G.R." for noting the particular consignment (G.R. standing for Goods Received Note). It is a most useful check all round for distinction to be clearly made when a fresh consignment is started on. The metals used and supplies used will only be reported in this way in respect to foundry stock which has to be accounted for by the Foundry. As to metals, this will occur in the case of Iron Foundry only, the Brass Foundry having the metal issued to them day by day from the General Stores. The "Estimated Loss" will also be an Iron Foundry matter only, fortnightly stocktaking being effected in the Brass Foundry to give the actual loss. Size of form may be 6½" x 8".

CROSS REFERENCES.

F. 77—Forging Delivery Sheet.

PAGE	FORM
VI B. 473 Cost Allocation Routine.	F. 49—Production Instruction.
VI D. 510 Metal Costs—Smithy.	F. 52—Individual Order Production Chart
VI D. 515 Product Records—Smithy.	F. 71—Casting Delivery Sheet.
	F. 78—Smithy Daily Work Sheet.
	F. 79—Smithy Stock Control Book.
	F. 82—Goods Received Note.
	F. 118—Process Product Summary.
	F. 123—General Stock Ledger.
	F. 126—Component Stock Ledger.
	F. 127—Rough Component Rate Card.
	F. 129—Cost Allocation Card (1)—Materials Charged Direct.

F. 78—Smithy Daily Work Sheet (or Report).

PAGE	FORM
VI B. 473 Cost Allocation Routine.	F. 26—Job Account Card.
VI D. 505 Process Cost Allocation.	F. 72—Foundry Waster Ticket.
VI D. 515 Product Records—Smithy.	F. 73—Foundry Daily Work Sheet.
	F. 77—Forging Delivery Sheet.
	F. 98—Viewing Report.
	F. 118—Process Product Summary.
	F. 127—Rough Component Rate Card.
	F. 129—Cost Allocation Card (1)—Materials Charged Direct.

F. 79—Smithy Stock Control Book.

PAGE	FORM
VI D. 510 Metal Costs—Smithy.	F. 77—Forging Delivery Sheet.
	F. 87—Shop Credit Slip.
	F. 89—Stock Control Card (General).

										Date.		F.D. Ref.		F. 77 Forging Delivery Sheet.	
Office Order Nos.	Part No.	Short Description.	No. Forgings.	Total Net Wt.	Metal Used.			Metal Charge.			Process Charge.		Notes.		Goods Issue Voucher.
					Details.	G.R. Ref.	Estimated Metal Loss.	Wt. charged.	Rate.	Amt.	Rate.	Amt.			

This form is parallel to the Casting Delivery Sheet (F-71), and the notes there given apply here to a large extent. The need to specify the kind and size of metal used arises from the variations in cost of same, and when specially purchased for an order, the Goods Received Note (G.R.) Ref. needs to be quoted, obviating the necessity for other details. The Estimated Metal Loss may be derived by applying percentages, varied according to the judgment of the Smithy Foreman, or may be the actual measured losses. Separate sheets are necessary for forgings passed into stock as rough components.

										Date.....				F. 78 Smithy Daily Work Sheet.
Check No.	Machine No.	Office Order No.	Part No.	Short Description.	Day's Out- put. Forgings Made	Time Taken.	Wages.		Shop Charges.		Deliveries.			
							Rate.	Amt.	Rate.	Amt.		F.D. Ref.		

This form corresponds with the Foundry Daily Work Sheet (F 73), and the remarks there given will apply here largely. In making up the sheet, space will be allowed for grouping together all the day's jobs of each smith, and the smith's assistant's time will be booked along with the smith's. The wasters made in the Smithy will not be enough to require the equivalent of Foundry Waster Tickets (F 72), and any waste that does occur can very well be made the subject of a Viewing Report (F 98) and dealt with as if the forging had left the Smithy—being duly entered up accordingly as to time taken and metal used. Separate sheets are necessary for forgings passed into stock as rough components. This may involve extraction of such items, rather than a divided record of each smith's output. Size of form may be 6½" x 8".

										Sizes.		Metal.	
Metal Received.					Total to be ac- counted for.	Allocation.			Special Returns.			Total ac- counted for.	Balance.
Date.	G.R. Ref.	For Order.	Size.	Weight Re- ceived.		Office Order.	F.D. Ref.	Weight.	Date.	Credit Slip.	Weight.		

This sheet is self-explanatory, except as to Special Returns. The routine intended is that all surplus metal, after completing the forgings required, shall revert to Smithy Stock—not therefore being allocated. This holds good only if the surplus metal is still worth its full value. When, however, the surplus is not worth full value, the metal is sent to the General Stores with a Shop Credit Slip (F-87), and then re-issued to the Smithy at a suitable price.

F. 79

Smithy Stock
Control Book.
(Loose leaf.)

CROSS REFERENCES.

F. 80—Purchase Delivery Reminder Card.

PAGE
IV B. 279 Purchase Requisitions.
IV B. 285 Urging Deliveries.

FORM
F. 15—Purchase Order.
F. 52—Individual Order Progress Chart.
F. 81—Purchase Order Endorsement.

F. 81—Purchase Order Endorsement.

PAGE
IV B. 285 Urging Deliveries.
IV C. 295 Material Receipt.

FORM
F. 15—Purchase Order.
F. 52—Individual Order Progress Chart.
F. 80—Purchase Delivery Reminder Card.

F. 82—Goods Received Note.

PAGE
II F. 154 Progressing and Work Depot Routine.
IV C. 295 Material Receipt.
IV C. 296 Returnable Packages.
IV C. 297 Non-Purchase Receipts.
IV C. 297 Rejections and Replacements.
IV C. 298 Identification of Goods.
IV C. 308 Timber.
IV C. 312 Issue of Stock.
V G. 373 Accuracy in Stock Accounts.
V G. 374 Special Purchases.
V G. 383 Stock Ledger.
VI B. 454 Material Allocation.
VI B. 455 Purchase Invoices.
VI B. 473 Cost Allocation Routine.

FORM
F. 15—Purchase Order.
F. 52—Individual Order Progress Chart.
F. 71—Casting Delivery Sheet.
F. 76—Foundry Weekly Material Report
F. 77—Forging Delivery Sheet
F. 83—Acknowledgment of Goods Received.
F. 84—Returnable Package Card.
F. 85—Stores Tally
F. 86—Goods Issue Voucher.
F. 98—Viewing Report.
F. 110—Warehouse Stock Control Book.
F. 115—Works Accounts Register (I.)—Purchases.
F. 121—Disbursements Book.
F. 122—Suppliers' Package Record.
F. 123—General Stock Ledger.
F. 124—General Stock Rate Card.
F. 126—Component Stock Ledger.
F. 129—Cost Allocation Card (I.)—Materials Charged Direct.
F. 143—Loose Plant Rate Card.
F. 165—Credit Claim Note.

				<p>This is arranged as a postcard with illustration on back advertising some line of product.</p> <p>These postcards are sent out for every purchase order where delivery from stock is not reasonably assured.</p>				
Purchase Order No.		Dated.	For.					
Kindly note we rely on delivery being made on or before								
Please do not fail to send by post an ADVICE OF DESPATCH , the same day as goods are sent.								
Delivery Reminder.		Telephone Enquiries.	Letters Sent.	Telegram.	<p>This illustrates a rubber stamp endorsement for placing on the Copy of Purchase Order when received at the General Stores. The endorsement will be put on the front of the order, though, if usually put on the reverse side, same can be printed instead. Rubber Stamps of this style are cheaper and handier when mounted on wood moulding.</p>			
Quantity Received		Date.	G.R. Ref	Returns.				
Supplier.			Purchase Requisition No.	Purchase Order No.	Date Goods Received.	Ref. G.R.		
Entered for Stock Control	Description of Goods.		Quan rec'd.	Rejections.	Notes.	Price.	Invoice Cost.	
Per.	Carr.	Quan. Certified by	Goods Inspected by.		Inv. No	Ret'ble Packages.		
Cost Allocation Ref.....							Credit Claims.	
Space for Goods Issue Vouchers to be attached in the case of Materials charged direct.								

These notes are made out by the Receiving Clerk in carbon duplicate, the duplicate being retained in the General Stores. The loose note is duly signed by the person responsible for the inspection of the goods, the Receiving Clerk having previously signed as to quantity received of the goods as described. A Stores Tally (F 85) is prepared for each consignment, if it is proposed to keep independent track of same. Many items will be merged at once with existing stock, and no attempt can be made to record the disposal of such consignments. The loose note will be passed to the Works Office (Production Section) for noting on the Progress Chart, Form F 52, and then passed to the Works Accounts Office, where it will be used to check the invoice, and be completed as to prices. The Invoice No. referred to on the form is the number appearing against the corresponding entry in the Works Accounts Register (F 115). Credit Claims (F 165) arising from rejections or other cause are noted also. The Goods Issue Vouchers (F 86) in respect to Purchases charged direct are attached to the respective G.R. Notes in the Works Accounts Office as they come to hand from the General Stores. Size of form may be 6½" x 8", printed two deep, in book style, with the carbon duplicate fast.

F. 80

Purchase
Delivery
Reminder
Card.

F. 81

Purchase
Order
Endorsement.

F. 82

Goods
Received
Note.

CROSS REFERENCES.*F. 83—Acknowledgment of Goods Received.**(Acknowledgment of Customers' Returns.)*

PAGE	FORM
II C. 107 Pattern Records.	F. 43—Product Complaints Report.
IV C. 297 Non-Purchase Receipts.	F. 51—Sales Sundries Order Specification.
IV E. 329 Packages.	F. 82—Goods Received Note.
V H. 396 Goods on Loan.	F. 119—Finished Stock Product Summary.
VI B. 457 Purchase Invoices.	

F. 84—Returnable Package Card.

PAGE	FORM
VI B. 459 Returnable Packages.	F. 82—Goods Received Note.
	F. 113—Advice of Despatch.
	F. 114—Outwards Package Tracing Card.
	F. 122—Suppliers' Package Record.
	F. 165—Credit Claim Note.

F. 83

**Acknowledg-
ment of Goods
Received.**
(Non-Purchase.)

Ref. G.A. Date Kindly quote both when replying.	
We beg to acknowledge receipt of the undermentioned.	
Package.	per
Carriage.	
Description of Goods.	
<p>These acknowledgments are made out in respect to goods received that are not purchases. It may be convenient to have these goods received at the Warehouse, as usually referring to Sales Sundries and Repair Orders. The form can be used as a bare acknowledgment, or suitable notes can be added in the blank space provided at foot. By suitable endorsement it might serve as a Credit Note, where the amount of credit due is obvious. By having the form in triplicate (two loose and one fast in book), two copies can be sent forward to the General Office, who may or may not add any comment before posting one copy to the sender of the goods. The Warehouse can advantageously cut off the corner as each case is dealt with, such as by the return of the goods or supply of replacement. Size of form may be 6½" x 8".</p>	
Date received..... G.R. No..... Supplier..... Package..... Charge..... Date of Invoice..... Inv. Ref.....	<p>These cards are issued by the Works Accounts Office to the General Stores immediately it is possible to match the Goods Received (G.R.) Note (F 82) with the Supplier's Invoice. No package is to be returned except on the authority of these cards, the cost of carriage being considered against the charge for the package. The Returns Advice Note, or adapted Advice of Despatch (F 113) is made to serve as a debit to the supplier by the values and invoice date being given (see Discussion). The cards are duly returned to the Works Accounts Office for checking purposes, and to notify the appropriation of any package for works or sales purposes. Size of form may be 6" x 5".</p>
RETURNED. Date..... Returns Advice Ref..... Cost of Carriage..... Signed.....	

F. 84

**Returnable
Package Card.**

CROSS REFERENCES.

*F. 85—Stores Tally.**(Stores Bin Ticket.)*

PAGE		FORM	
II F. 152	Progressing and Work Depot Routine.	F. 82—	Goods Received Note.
IV C. 298	Identification of Goods.	F. 86—	Goods Issue Voucher.
IV C. 300	Stock Control.	F. 89—	Stock Control Card (General and Component).
IV C. 312	Issue of Stock.	F. 108—	Works Product Ticket.
V G. 373	Accuracy in Stock Accounts.		

F. 86—Goods Issue Voucher.

PAGE		FORM	
II F. 152	Progressing and Work Depot Routine.	F. 53—	Quantity Slip.
II F. 153	Work Depot—Routine Diagram.	F. 55—	Stock Appropriation Ticket.
IV C. 298	Identification of Goods.	F. 56—	Reserve Stock Control Card.
IV C. 299	Stock Control.	F. 71—	Casting Delivery Sheet.
IV C. 302	Sub-Stores Organisation.	F. 76—	Foundry Weekly Material Report.
IV C. 309	Component Stock.	F. 82—	Goods Received Note.
IV C. 310	Issue of Stock.	F. 85—	Stores Tally.
IV D. 322	Warehouse Requisitions.	F. 88—	Timber Ticket
V G. 373	Accuracy in Stock Accounts.	F. 89—	Stock Control Card (General and Component)
V G. 374	Special Purchases.	F. 101—	Assembling Order.
V G. 375	Sub-Stores Stock Accounts.	F. 102—	Erecting Order.
V G. 380	General Stock Rate Records.	F. 123—	General Stock Ledger
V G. 383	Stock Ledger.	F. 126—	Component Stock Ledger.
VI B. 454	Material Allocation.	F. 129—	Cost Allocation Card (I.).
VI B. 474	Cost Allocation Routine.	F. 130—	Cost Allocation Card (II.).
VI D. 508	Metal Costs—Brass Foundry.		
VI D. 514	Product Records—Foundry.		

F. 87—Shop Credit Slip.

PAGE		FORM	
II G. 167	Rejection Routine.	F. 72—	Foundry Waster Ticket.
IV C. 313	Returns from Shops—Stock Control.	F. 79—	Smithy Stock Control Book.
V G. 379	Returns from Shops and By-Products—Stock Accounts.	F. 89—	Stock Control Card (General and Component).
V G. 383	Stock Ledger.	F. 98—	Viewing Report.
VI B. 454	Material Allocation.	F. 119—	Finished Stock Product Summary.
VI B. 474	Cost Allocation Routine.	F. 123—	General Stock Ledger.
		F. 126—	Component Stock Ledger.

*F. 88—Timber Ticket.**(Timber Issue Ticket.)*

PAGE		FORM	
IV C. 308	Timber Stores Organisation.	F. 66—	Component Pattern Register.
V G. 376	Timber Stock Account.	F. 86—	Goods Issue Voucher.
V G. 383	Stock Ledger.	F. 125—	Stock Issue Abstract.
VI B. 474	Cost Allocation Routine.	F. 130—	Cost Allocation Card (II.).

G.R. or Delivery Stock Control Ref. Ticket Ref.							
Description							
Location Ref.				Intended for			
Ordering Level				Office Order No.			
Quan. received.	Issues.				Balance.		
	Date.	Sub-Order.	Quan.	By.			
No. G.V.							
Date ready.	G.R. Ref.		For Office Order No.				
Quan.	Description						
Allocation.	Sub-Order.	Quan.	Rate.	Cost.			
Signed Dept. Date							
Return of Goods originally supplied for Sub-Order No. Office Order No.							
Description.		Quan.	Rate.	Credit.			
Reason of Return.		Condition of Goods.					
Received by.	Date.	Signed.	Dept.				
Office Order No.							
Date							
Purpose.	Kind of Timber.	Length.	Width.	Thickness.	Fest Super.	Rate.	Cost.
Used by		Dept.	Signed.				

These tallies are made out in respect to each consignment of goods received at the General Stores, which it is desired to keep a separate account of, instead of merging with stock in hand. Its principal application is to goods specially purchased, or process products specially made for a particular Office Order. Provision is, however, made for a cross reference to the Stock Control Records when purely stock purchases are treated on these tallies. The provision for noting the ordering level is useful when the tally serves the function of a stock control record, or alternatively for the Stores Server's guidance in reporting low stocks. The Stores Server will fill in the issues as the Goods Issue Vouchers come to hand. On complete issue the tally is sent to the Works Accounts Office. Size of form, any ordinary tally size, say $2\frac{1}{2} \times 5$ ".

F. 85
Stores Tally.

These vouchers are prepared in the General Stores as an advice to the Work Depot or other department first concerned, of each consignment of goods received for a specific Office Order. The goods are duly issued when the voucher is sent back signed by the department receiving the goods. The vouchers will be initiated by the Work Depot for goods from stock, according to Quantity Slips (F. 53). Any department may use the vouchers for goods required from stock within limits that do not overlap the functions of the Work Depot. The vouchers pass from the Stores to the Works Accounts Office. Forms may be $3 \times 5\frac{1}{2}$ " in carbon duplicate.

F. 86
Goods Issue Voucher.

These credit slips serve firstly to control loans to the shops. They are made out in carbon duplicate by the Stores—except as to quantity—and the detachable copy is sent with the loaned goods. Any material issued for convenience in excess of requirements, e.g. bar, is treated as on loan. The carbon copy is retained by the Stores as a reminder, and when the loaned goods or excess material is returned, a corner is cut off the carbon copy to show the item is cleared. For many items, such as scrap and swarf, the credit slips must originate in the dept. sending same to the Stores. The slips will be passed from the Stores to the Works Accounts Office.

F. 87
Shop Credit Slip.

These tickets are arranged to provide a handy means whereby the allocation of timber to specific orders can be effected. The tickets are made out by the men using the timber and signed by the foreman. Where there is a Timber Store Attendant, and consequent local stock records, the tickets will be passed to him for noting on his stock control cards (see discussion, p. 308. The tickets must ultimately pass to the Works Accounts Office.

F. 88
Timber Ticket.

CROSS REFERENCES.

F. 89—Stock Control Card (General and Component).

PAGE	FORM
IV c. 289 Stock Classification.	F. 55—Stock Appropriation Ticket.
IV c. 300 Stock Control.	F. 56—Reserve Stock Control Card.
IV c. 302 Wholesale and Retail Stock.	F. 75—Foundry Stock Control Book.
IV c. 302 Sub-Stores.	F. 79—Smithy Stock Control Book.
IV c. 309 Component Stock.	F. 85—Stores Tally.
IV c. 313 Returns from Shop—Stock Control.	F. 86—Goods Issue Voucher.
IV d. 321 Sales Order Routine.	F. 87—Shop Credit Slip.
V g. 372 Functions of Stock Accounts.	F. 95—Tool Stores Stock Control Card.
V g. 374 Stock Checking or Scrutiny.	F. 108—Works Product Note.
V g. 378 Returns from Shop and By-Products—Stock Accounts.	F. 110—Warehouse Stock Control Book.
V g. 385 Stock Values for Profit and Loss Accounts.	F. 123—General Stock Ledger.
VI d. 511 Metal Costs—Smithy.	F. 125—Stock Issue Abstract.
	F. 126—Component Stock Ledger.
	F. 139—Stocktaking Slip.

F. 89

Stock Control Card.
(General and Component.)

Location.		Unit of Quan.		Ordering Level.		Normal Quan. to be Ordered.		Material.					
Advance Appropriation.				Purchase Orders.				Receipts.					
Date.	Stock Appropriation Ticket No.	Order No.	Quan.	Purchase Requisition No.	Date.	Ref.	Supplier.	Quan.	Total to Date.	Date.	G.R. No.	Quan.	Total to Date.

(Continuation of Headings)

Description..... Class No.

Size or Mark. Item Ref.

ISSUES.				TRANSFERS.				Balance.	STOCK SCRUTINY.				
Date.	Allocation Ref.	Quan.	Total to date.	Date.	Sub-Store.	Quan.	Total to date.		Date.	Actual Stock.	Taken by.	Surplus.	Deficit

This card is designed primarily for the control of general stock, as defined in Section IV c but applies also for component stock, whether in the rough or finished stage. Its application to component stock is intended to be limited to such stock as is held by the General Stores. A separate form (F 110) is provided for dealing with Warehouse Stock, comprising spare parts and complete products.

The issue of component stock is arranged to be subject to authorisation by Stock Appropriation Tickets. When these come to hand without the items being in stock, advance appropriation is noted on the card, and the ticket handed back to the dept. presenting the ticket. A Goods Issue Voucher (F 86) quoting the Stock Appropriation Ticket No. is made out by the General Stores as soon as the necessary items are received into stock, and then sent forward as an advice to the dept. concerned. "Item Ref." refers to the reference adopted to identify the particular size and kind of article in question. It assumes that some classification scheme is adopted. In the case of component stock, the item ref. will be the part No. or standard fittings (S.F.) ref. In the illustration the quantity columns are shown ruled into four by dotted lines, thus serving for weights or liquid measure, whether same are expressed in the usual way or as lbs. and pints respectively. Provision is made for booking transfers from the main stores to sub-stores. These transfers will appear as receipts on the respective sub-stores stock control card. In the matter of stock scrutiny (see discussion, Section V g), this is carried out by the Works Accounts Office, and the results noted on this card. Under some conditions, the head of the General Stores might carry out a similar check himself, thus supplementing the efforts of the Works Accounts Office. Where "wholesale" stock is held (see Section IV c), only the issues to the "retail" branch of the Stores will be entered on these cards, thus obviating voluminous entries of actual issues to orders. The stock control cards dealing with wholesale stock should be clearly marked "Wholesale" with a rubber stamp, or better still, be of distinctive colour. Size of card may be 8½" x 11".

CROSS REFERENCES.

*F. 90—Print Loan Slip.**(Drawing Loan Slip.)*

PAGE
II B. 103 Shop Prints.

FORM
F. 45—Print Delivery Ticket.
F. 58—Operation and Tools Provided Schedule.

F. 91—Tool Loan Slip.

PAGE
II E. 143 Tool Custody.
IV C. 301 Sub-Stores Organisation.
V G. 376 Sub-Stores Stock Accounts.

FORM
F. 21—Tool Clearance Ticket.
F. 58—Tools Provided Schedule.
F. 92—Tool Permanent Loan Record
F. 93—Summary of Tools Broken or Lost.
F. 94—Completed Tool Advice.
F. 95—Tool Stores Stock Control Card.
F. 144—Loose Plant Inventory Sheet.

*F. 92—Tool Permanent Loan Record.**(Workman's Tool Book.)*

PAGE
II E. 143 Tool Custody.
IV C. 306 Implements and Utensils.
V H. 394 Preparations for Stocktaking.

FORM
F. 21—Tool Clearance Ticket.
F. 91—Tool Loan Slip.
F. 93—Summary of Tools Broken or Lost.
F. 95—Tool Stores Stock Control Card.
F. 144—Loose Plant Inventory Sheet.

F. 93—Summary of Tools Broken or Lost.

PAGE
II E. 144 Tool Custody.

FORM
F. 91—Tool Loan Slip.
F. 92—Tool Permanent Loan Record.
F. 95—Tool Stores Stock Control Card.

Drawing No. Date Check No. Signed..... <p style="font-size: small;">This drawing must be returned as soon as finished with, but in any case on Saturday by 12 noon.</p>	<p>These slips are made out by the men desiring to borrow drawings. In the drawing stores section of the Tool Stores, there may be a large black-board for noting drawings in loan. The loan slips are filed in a card index under the drawing No. and returned to the man when drawing is returned. Anyone else requiring a drawing already loaned may give in a new loan slip in exchange for the existing loan slip, which is then utilised for exchanging with the borrower for the drawing. Size of form may be 2½" x 3½", made up thin pads.</p>																																																																																														
Tool No. as per Tools Provided Schedule for Part No. Description Date..... Check No..... Signed..... <p style="font-size: small;">This tool must be returned as soon as finished with. Any damage occurring in use must be reported to the shop foreman.</p>	<p>These slips are used for tools very much the same as Drawing Loan Slips. There is a standard supply of brass tool checks for each man arranged on hooks, and as a tool is loaned, a tool check is put in its place or sufficiently so to indicate who has any given tool. The slips are filed under the man's check No. and given back to the man as the tools are returned. Certain measuring tools may have to be returned at the end of each day. Size of form same as Drawing Loan Slip, but of distinctive colour.</p>																																																																																														
Dept. Name Check No.																																																																																															
<p style="font-size: x-small;">This book is for entering up all tools and appliances making up each worker's regular or permanent kit. The original issue must be authorised by the shop foreman, but renewals of files and cutting tools will be made by the tool stores chargehand on receipt of worn tool. All tools entered here must be accounted for at any time when requested by tool stores chargehand, and must all be handed in on transfer to another department or on leaving. Tools on temporary loan are to be applied for by tool loan slips and such loans are not to be entered in this book</p>																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th rowspan="2">Date.</th> <th rowspan="2">Quan.</th> <th rowspan="2">Description.</th> <th rowspan="2">Fore- man's Signa- ture.</th> <th rowspan="2">Served by.</th> <th colspan="4">Renewals.</th> <th colspan="2">Received back.</th> </tr> <tr> <th>Date By.</th> <th>Date By.</th> <th>Date By.</th> <th>Date By.</th> <th>Date.</th> <th>By</th> </tr> </thead> <tbody> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> </tbody> </table>		Date.	Quan.	Description.	Fore- man's Signa- ture.	Served by.	Renewals.				Received back.		Date By.	Date By.	Date By.	Date By.	Date.	By																																																																													
Date.	Quan.						Description.	Fore- man's Signa- ture.	Served by.	Renewals.				Received back.																																																																																	
		Date By.	Date By.	Date By.	Date By.	Date.				By																																																																																					
<p>The routine in connection with the use of this book is sufficiently indicated by the notes embodied in the illustration. It may be convenient in some works to print in the names of tools issued to the majority of the workers, such as padlock and key. Men should be encouraged to furnish high-class padlocks of their own, as additional security against improper access, providing a duplicate key is lodged with the Tool Store Chargehand personally. The character of the latter ought to be such as to ensure confidence in his support of their efforts to preserve their own tools equally with the firm's against theft.</p>																																																																																															
Dept. Fortnight ending																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th rowspan="2">Check No.</th> <th colspan="2">Plain Tools.</th> <th colspan="2">Drills.</th> <th colspan="2">Taps.</th> <th colspan="2">Reamers.</th> <th colspan="2">Mlg. Cutters.</th> <th colspan="2">Cutter Bars.</th> <th colspan="2">Cutters.</th> <th colspan="2">Drifts.</th> <th colspan="2">Various.</th> </tr> <tr> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>B'kn.</th> <th>Lost.</th> <th>Broken.</th> <th>Lost.</th> </tr> </thead> <tbody> <tr> <td>0</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> <tr> <td>1</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> <tr> <td>2</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> </tbody> </table>		Check No.	Plain Tools.		Drills.		Taps.		Reamers.		Mlg. Cutters.		Cutter Bars.		Cutters.		Drifts.		Various.		B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	Broken.	Lost.	0																			1																			2																		
Check No.	Plain Tools.		Drills.		Taps.		Reamers.		Mlg. Cutters.		Cutter Bars.		Cutters.		Drifts.		Various.																																																																														
	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	Broken.	Lost.																																																																													
0																																																																																															
1																																																																																															
2																																																																																															
<p>This summary is made up by the Tool Stores Chargehand, as breakages and losses become known. A set of sheets comprising all check Nos. is made up in advance for each fortnight. To facilitate this, the unit figures 0-9 are printed down the sheets.</p>																																																																																															

F. 90
Print Loan
Slip.

F. 91
Tool Loan
Slip.

F. 92
Tool Per-
manent Loan
Record.

F. 93
Summary of
Tools Broken
or Lost.

CROSS REFERENCES.

F. 94—Completed Tool Advice.

PAGE
II E. 141 Tool Provision.

FORM
F. 52—Individual Order Production Chart.
F. 58—Tools Provided Schedule.
F. 59—Tool Order.
F. 91—Tool Loan Slip.
F. 95—Tool Stores Stock Control Card.
F. 108—Works Product Note.
F. 143—Loose Plant Rate Card.
F. 160—Interdepartmental Delivery Note.

F. 95—Tool Stores Stock Control Card.

PAGE
II E. 141 Tool Provision.
IV C. 292 Stock Classification.

FORM
F. 89—Stock Control Card (General).
F. 91—Tool Loan Slip.
F. 92—Tool Permanent Loan Record.
F. 93—Summary of Tools Broken or Lost.
F. 94—Completed Tool Advice.
F. 144—Loose Plant Inventory Sheet.

*F. 96—Plant Order.**(Plant Sub-Order.)*

PAGE
V J. 400 Plant Records.
V J. 407 Treatment of Capital Expenditure.
V J. 410 Control of Capital Expenditure.
V J. 412 Control of Repair Expenditure.
V K. 424 Valuation of Buildings and Fixed Plant.
VI A. 451 Cost Allocation Principles.
VI B. 471 Works Capital Additions.
VI C. 478 Function of Standing Orders.
VI F. 540 Ascertainable Incidence of Works Expenses.

FORM
F. 54—Purchase Requisition.
F. 64—Plant Record Card.
F. 65—Plant Efficiency Report.
F. 106—Departmental Memorandum.
F. 129—Cost Allocation Card (I.).
F. 130—Cost Allocation Card (II.).
F. 131—Cost Allocation Card (III.).
F. 137—Plant Orders Cost Summary.
F. 158—Plant Stoppage Report.
F. 159—Foreman's Requisition.
F. 160—Interdepartmental Delivery Note.

Ref. O.T.		Tool No.
Description of Tool and Operation.		For Use on Office Order No.
Quantity		Part No.
Tool as above sent to Tool Stores	Inspected by	Date
For issue to Dept.		

F. 94

Completed
Tool Advice.

These advices are made out in triplicate, one copy serving as a delivery ticket to the Tool Stores, and the second copy as an advice to the Machine Shop. The third copy is retained by the foreman toolmaker. Inspection should include testing, and the View Room should, preferably, agree the test with the foreman toolmaker. In mass production this initial testing is of far-reaching importance. The replacement of jigs and special tools calls for the most careful verification. The advice slips in the Tool Stores may be pasted on cards for better filing.

CLASS														
Description.										Size.				
On Order.			Received.				Reserve Stock.			Tools in Service.		Tools Scrapped.		Working Reserves.
Date.	Ref.	Quan.	Date.	G.R. Ref.	Tool Advice.	Quan.	In.	Out.	Balance.	Date.	Quan.	Date.	Quan.	

F. 95

Tool Stores
Stock Control
Card.

These cards are intended to be entered up by the Tool Stores Chargehand. Provision is made for noting the reserve stock, which is supposed to be under the control of the Tool Stores Chargehand, but suitably separated from the working stock of tools. This course is better than requiring the General Stores to maintain a stock of new tools, emery wheels, and the like. Ordinary utensils and implements (see Section IV c) may have to be held in both stores. Size of form may be 5" x 8".

Plant Group										Date										No.									
Special Materials Req'd.			Plant Ref.		Description.			For Dept.		A/c. Ref.		Addition, Renewal, Alteration, Repair.																	
Purch. Req'n.	Particulars.	Quan.	Particulars of work to be done by Dept.												Estimated Cost, Material, Wages.														
			Sub-Order made out by								Approved.																		
..... Works Manager.																													

F. 96

Plant Order

These sub-orders may be made out by the Tool Stores Chargehand as to the everyday repair requirements (see discussion, Section V j), and within specified limits he may issue the orders without waiting for Works Manager's approval. The orders are made out in triplicate, one passing to dept. executing the order and the second copy to the Works Manager for approval and for passing on to the Works Accounts Office. There are two series of orders, "R" for repairs and "N" for new work. Renewals and alterations will be included in the "N" series equally with additions and the final allocation (A/c Ref.) settled later (see discussion, Section V j) and Plant Sub-Orders Cost Summary, N Series (F-137). Departmental Memorandums (F 106) are used by foremen for notifying their requirements to the Tool Stores. The necessary purchase requisitions may be made out in the Tool Stores under the guidance of the Works Office (Production Section). The more important orders will be initiated by the Works Manager personally.

CROSS REFERENCES.

*F. 97—Operation Progress Ticket.**(Progress or Stage Ticket.)**(Shop Delivery Ticket.)*

PAGE		FORM	
I D. 47	Internal Correspondence.	F. 26—	Job Account Card (Job Ticket).
II F. 153	Work Depot Routine Diagram.	F. 58—	Tools Provided Schedule.
„ 155	Progressing and Work Depot Routine.	F. 98—	Viewing Report.
„ 156	Shop Control.	F. 99—	Inspection Certificate.
II G. 166	Shop Inspection.	F. 100—	Work Tally (Machining Sub-Order).
V F. 364	Extra Pay Computation.	F. 104—	Work Depot Production Programme.
VI B. 463	Wages Allocation.	F. 105—	Weekly Component Shortage List.
		F. 108—	Works Product Note.
		F. 119—	Finished Stock Product Summary.
		F. 160—	Interdepartmental Delivery Note.

F. 98—Viewing Report.

PAGE		FORM	
II F. 150	Diversion of Components in Progress.	F. 25—	Job Advice Slip.
II G. 167	Rejection Routine.	F. 55—	Stock Appropriation Ticket.
V D. 348	Job Records.	F. 72—	Foundry Waster Ticket.
V F. 365	Extra Pay Computation.	F. 82—	Goods Received Note.
VI B. 467	Purchase Invoices.	F. 87—	Shop Credit Slip
„ 469	Errors and Defects.	F. 97—	Operation Progress Ticket.
VI D. 511	General Costs—Iron Foundry.	F. 99—	Inspection Certificate.
VI G. 531	Cost Transfers.	F. 100—	Work Tally (Machining Sub-Order).
		F. 104—	Work Depot Production Programme.
		F. 133—	Cost Transfer Journal.
		F. 165—	Credit Claim Note.

F. 99—Inspection Certificate.

PAGE		FORM	
II G. 165	Shop Inspection.	F. 50—	Erecting Specification Card.
IV D. 318	Warehouse Stock Control.	F. 52—	Individual Order Progress Chart.
IV D. 319	Final Inspection.	F. 97—	Operation Progress Ticket.
IV E. 324	Final Records.	F. 98—	Viewing Report.
		F. 101—	Assembling Sub-Order.
		F. 102—	Erecting Sub-Order.
		F. 108—	Works Product Note.
		F. 112—	Packing Slip.

					<p>The purpose of the progress ticket is discussed in Section II F, and is briefly a delivery and viewing ticket. It serves as a "move" instruction to the shop labourer, and the receiving chargehand holds the ticket as a tracing ticket for work in hand. When the operation is completed as to the sub-order in question, the viewing certificate at the foot of the ticket is filled in by the party responsible for viewing and the ticket sent through the works post to the Wages Office. A new ticket for the next operation is made out by the same party, and accompanies the work accordingly. The Tools Provided Schedule (F 58) may possibly define the sequence of operations. If viewing is only to follow groups of operations, the several operations may be named on this Ticket to guide the shops, the operations as done being marked off by the respective chargehands.</p> <p>Rejections are made the subject of a separate Viewing Report (V.R.).</p>				
Part No. or Description.	Quan.	Sub-Order.	Office Order.						
Operation.			Date.						
			Box No.						
Check No.									
• Viewing Certificate.									
Passed.	Rejects.	V.R. No.	Date.	Signed.					
(Give clear explanations.) V.R.					<p>These reports are made out in respect to the following :</p> <ol style="list-style-type: none"> (1) Work rejected in course of production. (2) Work passed, but not up to the standard limits of size. (3) Errors in drawings necessitating alteration to work (4) Transfers of components from one order to another in course of production. (5) Inspection of purchased goods when not certified on Goods Received Note <p>The reports are made out by the View Room in triplicate, one copy remaining for reference, one copy passing to the Works Office (Production Office) to arrange for replacement, passing thence to the Ratefixer for estimating cost of fault, who duly advises Wages Office if necessary, and passes report on to Works Accounts Office, the third copy is passed to the Work Depot with the rejected material. The Work Depot make out the necessary Shop Credit Slips (F 87) for disposing of the scrap, after Ratefixer has made up estimate. Probably Works Manager will wish to see all scrap before same is sent from Work Depot. Size of form may be 4" x 6".</p>				
Office Order No.									
Sub-Order No.									
Other Ref.									
Replacement Arranged for.		Date.	Signed.						
(Reverse Side.)									
V.R.									
Dept. responsible.....		Estimated cost of fault.							
Workman.....		Material less value of scrap							
		Wages Shop Charges							
Extra Allowance for Check No.		Total							
.....Hrs. Mins.		Signed.....							
allowed. Job Advice Slip sent to Wages Office.		Noted Wks. Accts.....							
Date.....No.....									
Office Order No.		TO WORK DEPOT.			<p>These certificates are provided to record the inspection of assembly units and erected product, for which Progress Tickets will probably not be made out. The inspection may be carried out by the foreman, but preferably by an independent inspector. With certain products, running or other tests may be essential to complete the inspection. A space is provided for noting if customers' inspection has been carried out, or is to follow, or is not required. The certificate is sent to the Work Depot for noting on the Progress Chart, Form 52, and thence to Works Accounts Office by way of the Works Office (Production Section). Size of form may be 4" x 6".</p>				
Pro. No.	Quan.	The..... have satisfactorily passed the standard Works Inspection and Tests.							
Sub-Order No.		Signed							
A.U. Ref.	Quan.	Customer's Inspection.							

F. 97

Operation
Progress
Ticket.

F. 98

Viewing
Report.

F. 99

Inspection
Certificate.

CROSS REFERENCES.

F. 100—Work Tally or Machining Sub-Order.

PAGE	FORM
II B. 96 Drawing and Product References.	F. 47—Drawing Summary.
II F. 151 Progressing and Work Depot Routine.	F. 48—Assembly List.
II F. 153 Work Depot—Routine Diagram.	F. 52—Individual Order Progress Chart.
II F. 155 Progressing and Work Depot Routine.	F. 53—Quantity Slip.
II G. 166 Shop Inspection.	F. 61—Job Record Sheet.
V D. 348 Job Records.	F. 97—Progress Ticket.
VI B. 450 Cost Allocation Principles.	F. 98—Viewing Report.
VI E. 524 Rating of Finished Stock Products.	F. 103—Daily List of Sub-Orders Issued.
	F. 104—Work Depot Programme.
	F. 105—Weekly Component Shortage List.
	F. 155—Job Ticket.

F. 101—Assembling Sub-Order.

PAGE	FORM
I A. 10 Production Programme.	F. 47—Drawing Summary.
II B. 96 Drawing and Product References.	F. 48—Assembly List.
II F. 153 Work Depot—Routine Diagram.	F. 52—Individual Order Progress Chart.
II F. 155 Progressing and Work Depot Routine.	F. 53—Quantity Slip.
VI B. 450 Cost Allocation Principles.	F. 86—Goods Issue Voucher.
VI E. 524 Rating of Finished Stock Products.	F. 99—Inspection Certificate.
	F. 105—Component Weekly Shortage List.
	F. 106—Departmental Memorandum.
	F. 126—Component Stock Ledger.
	F. 129—Cost Allocation Card (I.).
	F. 130—Cost Allocation Card (II.).
	F. 131—Cost Allocation Card (III.).

F. 102—Erecting Sub-Order.

PAGE	FORM
I A. 10 Production Programme.	F. 47—Drawing Summary.
II F. 155 Progressing and Work Depot Routine.	F. 50—Erecting Specification Card.
IV D. 317 Identification of Works Product.	F. 52—Individual Order Progress Chart.
IV D. 319 Final Inspection.	F. 86—Goods Issue Voucher.
IV E. 324 Final Records.	F. 99—Inspection Certificate.
VI B. 450 Cost Allocation Principles.	F. 102—Component Stock Ledger.
VI E. 524 Rating of Finished Stock Products.	F. 105—Component Weekly Shortage List.
	F. 107—Progressive No. Register.
	F. 129—Cost Allocation Card (I.).
	F. 130—Cost Allocation Card (II.).
	F. 131—Cost Allocation Card (III.).

Part No.....		Sub-Order No.....		Tally Coupon		(Reverse Side)	
Name.....		Quantity.....		S.O.....		Date Tally Issued.....	
Due Date.....		Due Date.....		Part No.....Quan.....		Date Work Issued.....	
Mat'l.....		Office Order No.....		Office Order No.....		First Operation.....	
						Rejects.....	
						Replacements.....	
						V.R. Date Quan. Date Quan.	

F. 100

Work Order
(Machine Shop Order)

These tallies constitute the sub-orders for the manufacture of components. They are made out in Work Depot in conjunction with the material available and the Work Depot Programme (F 104). The tally minus coupon is sent to the Shop foreman, to notify him the batch of material is ready. The coupon is retained in Work Depot for tracing purposes—the corner being cut off when material has been drawn. The Work Depot issues the requisite material on the return of the Work Tally accompanied by a Progress Ticket for the first operation. The tallies accompany the respective batches of work through all operations. The printing shown for reverse side applies to tally and coupon. Viewer enters on back of tally as to rejects and replacements joined up with original sub-order. Entry needs to be made of any transfers to other orders. Tallies for replacements are marked "X," followed by original sub-order ref. The tally coupons for completed sub-orders pass to Works Office (Production Section) for noting on Progress Chart, Form 52. Size of Tally about 2½" x 5".

Order No. A.S.					
Office Order No.....A.U. Ref.....					
Description.				Quan.	
Special Instructions.				Due Date.	
Date issued.					
Parts required to complete.					
Name.	Part No.	S.F. Ref.	Quan.	Date expected.	Date supplied.
Date completed.....Inspection Certificate No.....					

These sub-orders cover assembly units (see discussion, Section II b). They are made out in triplicate by the Work Depot, one copy remaining for reference, the second copy accompanying the sets of components to the foreman concerned, and the third copy passing to the Works Office (Production Section) for noting on the Progress Chart, Form 52, and thence to the Works Accounts Office for labour costing purposes. The completing issues, if sets are incomplete in first instance, may be dealt with by a Departmental Memorandum (F 106) to the Works Office, coupled with marking the items off the sub-order as issued to the shop. The works accounting requirements as to components drawn from stock will be met by a Goods Issue Voucher (F 86) covering the items drawn by the Work Depot from the General Stores in respect to the office order as a whole. Size of form may be 5" x 8".

F. 101

Assembling
Sub-Order.

Order No. E.S.					
Office Order No.....Pro. Nos.....					
Description.				Quan.	
Special Instructions.				Due Date.	
Assembly Unit.	A.U. Ref.	Quan.	Notes.	Date issued.....	
				Parts to follow.	
				Name.	Ref.
				Quan.	Date expected.
					Date supplied.
Date completed.....Inspection Certificate No.....					

The notes above as to Assembly Sub-Orders apply to these orders. To complete erection, certain loose components may have to be drawn from stock, or may have been made under the same office order reference. It may happen that the assembly units as drawn for erection will have been charged into stock, in which event Goods Issue Vouchers will be required for accounting purposes accordingly. Where there are differences in finish or accessories between items of complete product made under the same office order No., it is important to issue separate sub-orders for the different progressive Nos. concerned, and such sub-orders must be fully recognised in the cost allocations with regard to material as well as wages.

F. 102

Erecting
Sub-Order.

CROSS REFERENCES.

F. 103—Daily List of Machining Sub-Orders Issued.

PAGE	FORM
II F. 152 Progressing and Work Depot Routine.	F. 52—Individual Order Progress Chart.
	F. 86—Goods Issue Voucher.
	F. 100—Work Tally.
	F. 131—Cost Allocation Card (III.)—Wages.

F. 104—Work Depot Production Programme.

PAGE	FORM
II F. 146 Sub-division of Production Orders.	F. 48—Assembly List
II F. 151 Progressing and Work Depot Routine.	F. 49—Production Instruction.
II F. 158 Urgent Work.	F. 52—Individual Order Progress Chart.
IV C. 310 Issue of Stock.	F. 53—Quantity Slip
	F. 97—Operation Progress Ticket.
	F. 98—Viewing Report.
	F. 100—Work Tally.
	F. 105—Component Weekly Shortage List.

F. 105—Component Weekly Shortage List.

PAGE	FORM
II F. 156 Progressing and Work Depot Routine.	F. 97—Operation Progress Ticket.
II F. 158 Urgent Work.	F. 100—Work Tally.
	F. 101—Assembling Sub-Order.
	F. 102—Erecting Sub-Order.
	F. 104—Work Depot Production Programme.
	F. 160—Interdepartmental Delivery Note.

Issued as Work Tallies to Dept.....Date.....							
S.O. No.	Office Order No.	Design Ref.	Short Description.	Quan.	Due Date.	Notes.	Completed tallies received.

F. 103

Daily List of
Machining
Sub-Orders.

This list is made up in carbon duplicate as the Work Tallies (F 100) are made out—thus serving as a register of numbers. The description may be restricted to the more notable pieces. At the end of each day, one copy passes to the Works Office (Production Section) for noting on the Progress Chart, Form 52, being evidence of raw material being available, and it is then passed to the Works Accounts Office, for making out Cost Allocation Cards (F 131). The material is charged to the office order as a whole through the medium of Goods Issue Vouchers (F 86). The provision for notes may be utilised for indicating to the Works Office the tallies that have been marked V U (Very Urgent). The list is passed back to Works Office and used for noting that tally coupon comes in when batch is completed, principally for marking off the Progress Charts. Size of form may be 10" x 8".

Office Order No.....				Assembly Sheet No.....				Assembly Dwg. No.....												
A.U.		Finished Parts Received.		Scrap and Transfers		Work Tallies.												Material Available		Lines No. For attaching to Assembly List.
Week.	S.O.	Ref.	Quan.	Ref.	Quan.	Week		S O			Date			Quan			Ref.	Quan.		
Quan.																				
Extra Slips attached here.						Extra Slips attached here.														
																			1	
																			2	
																			3	

F. 104

Work Depot
Production
Programme.

These sheets are arranged for placing in the same binder as the Assembly List (F 48) and Quantity Slip (F 53), so that the Work Depot Chargehand may fix the due dates for each sub-order with intelligent regard to ultimate requirements. It is arranged that the entries of quantities shall be in separate columns for each week's programme (as to due dates maturing therein), so as to allow regard to be paid more easily to the shop possibilities, and to facilitate the making out of the Weekly Shortage List (below). The entries of "material available" will be derived from the Goods Issue Vouchers (F 86) received from the General Stores advising receipt of material. Size of form to suit forms F 48 and F 53.

For issue to Dept.....Date.....						
Office Order No.	Part No.	Short Description.	Quan.	Work Tally S.O. No.	Notes.	Date received Work Depot.

F. 105

Component
Weekly
Shortage List.

These lists are based on the assembling requirements, and may be derived from the notes as to shortages appearing on the Assembly and Erecting Sub-Orders (F 101 and F 102), but it will allow an earlier anticipation to work from the Work Depot Programme Sheet (above). Theoretically no assembly or erecting sub-order should be effective if there are shortages of components. The shortage list is made out in carbon triplicate—one copy passing to the dept. having work in hand, and the second copy to the Works Office (Production Section) for a personal investigation of every item and marking tallies V.U. (Very Urgent). The third copy remains in the Work Depot for reference and marking off receipts. Size of form may be 10" x 8".

CROSS REFERENCES.

*F. 106—Departmental Memorandum.**(Foreman's Memorandum.)**(Warehouse Requisition.)*

PAGE		FORM	
I D. 47	Internal Correspondence.	F. 49—	Production Instruction.
IV D. 318	Warehouse Stock Control.	F. 51—	Sales Sundries Order Specifi-
IV D. 322	Warehouse Requisitions.		cation.
IV E. 329	Packages.	F. 52—	Individual Order Production
V J. 413	Control of Repair Expenditure.		Chart.
VI B. 474	Cost Allocation Routine.	F. 57—	Application for Stock Produc-
			tion Sanction.
		F. 59—	Tool Order.
		F. 96—	Plant Order.
		F. 101—	Assembling Sub-Order.
		F. 108—	Works Product Note.
		F. 110—	Warehouse Stock Control Book.
		F. 158—	Plant Stoppage Report.
		F. 159—	Foreman's Requisition.
		F. 160—	Interdepartmental Delivery Note.

F. 107—Progressive No. Register.

PAGE		FORM	
I A. 12	Production Programme.	F. 12—	Office Order—Sales or Produc-
IV C. 317	Identification of Works Pro-		tion.
	duct.	F. 43—	Product Complaints Report.
IV D. 319	Final Inspection.	F. 47—	Drawing Summary.
IV E. 324	Final Records.	F. 50—	Erecting Specification Card.
		F. 102—	Erecting Sub-Order.
		F. 108—	Works Product Note.
		F. 110—	Warehouse Stock Control Book.

*F. 108—Works Product Note.**(Works Product Delivery Note.)*

PAGE		FORM	
II F. 157	Shop Control.	F. 12—	Office Order—Production.
IV C. 309	Component Stock.	F. 52—	Individual Order Progress Chart.
IV D. 318	Warehouse Stock Control.	F. 85—	Stores Tally.
VI C. 493	Scrap Stock Value.	F. 89—	Stock Control Card.
VI E. 519	Purpose of Stock Production	F. 94—	Completed Tool Advice.
	Accounts.	F. 97—	Progress Ticket.
		F. 99—	Inspection Certificate.
		F. 106—	Departmental Memorandum.
		F. 107—	Progressive No. Register.
		F. 110—	Warehouse Stock Control Book.
		F. 119—	Finished Stock Product Sum-
			mary.
		F. 126—	Component Stock Ledger.
		F. 160—	Interdepartmental Delivery Note.

F. 109—Works Product Finished Weight Card.

PAGE		FORM	
II F. 157	Shop Control.	F. 39—	Standard Fittings Sheet.
IV E. 324	Final Records.	F. 40—	Component Design Comparison
			Sheet.
		F. 42—	Component History Card.
		F. 63—	Component Cost Comparison
			Card.
		F. 68—	Cross Index Sheet.

D.M.	
To Dept.	Date.
Office Order Ref.	Replying to D.M. No. dated
Other Ref.	
From Dept. Signed	

This memorandum form is for use between depts. By having it arranged in triplicate, with the second copy in every case passing, by means of the works post, to the Works Office (Production Section), it will be possible for much help to be afforded from the latter office. The memorandum will serve as a requisition from Warehouse to Works Office (Production Section) for replenishments of warehouse stock (complete product and spare parts) as a requisition on Tool Stores for Tool or Plant Sub-Order, for calling General Stores' or Work Depot's attention to delays, for requesting services of another department, for reporting tool damage, plant stoppage, etc.

F. 106
Departmental
Memorandum.

(Sheet Ref.)			Class of Product.....					
Pro. No.	Production Order No.	Date started.	Erecting Sub-Order.			Sales Ref.	Works Product Note.	
			Date.	Ref.	Special Instructions.		Ref.	Date.

This register is for use when progressive Nos. are given to the complete product. It may be applied to assembly units. The method of taking up numbers may be for one series to be used for all items in each class, or alternatively for each production order to have its own series starting at 1 in each case. The production order need not necessarily be for stock, but might be a Sales Order Ref. used as a production order. The dates of starting and completion (Works Product Note) will be useful for estimating future times of delivery. Size of sheet may be 13" x 8".

F. 107
Progressive
No. Register.

Date..... W.P.			
To The undermentioned products are now ready, having satisfactorily passed all requisite inspections and tests.			
Description.....		Quan. ready.. ..	
Catalogue Ref.		Quan. to come.....	
Part No. A. & Ref. Pro. No.	Made under Order No.	Special Features.	Inspection Certificate Ref.
Rec'd by		Signed.....	
Warehouse.		Work Depot Chargehand.	

This note is virtually a certificate of all work completed. It is made out in triplicate by the Work Depot, one copy passing to the Warehouse or General Stores, and one to the Works Office (Production Section), and thence to the Works Accounts Office for charging into stock if need be. No product not already in the Warehouse should be despatched without the authority of this note, or accepted into stock, thus ensuring maintenance of the system required for works accounts.

F. 108
Works
Product
Note.

Date.....	
Description.	Part No.....
	A.U. Ref.....
Dwg. No.	Material.....
Pro. No.....	
Manufactured Under Order No.	Weight of one.....lbs.
	Signed.....

These cards are filled in by the Work Depot under arrangement with the Drawing Office. Cross Index Sheets (F 68) may be used for noting weight cards made out. The cards are passed to the Drawing Office. Size of form may be 2½" x 3½".

F. 109
Works Pro-
duct Finished
Weight Card.

CROSS REFERENCES.

F. 110—Warehouse Stock Control Book.

PAGE	FORM
IV C. 309 Component Stock.	F. 15—Purchase Order.
IV D. 316 Warehouse Functions.	F. 55—Stock Appropriation Ticket.
IV D. 318 Warehouse Stock Control.	F. 82—Goods Received Note.
IV D. 321 Sales Order Routine.	F. 89—Stock Control Card (General and Component).
	F. 106—Departmental Memorandum.
	F. 107—Progressive No. Register.
	F. 108—Works Product Note.
	F. 111—Warehouse Daily Report of Despatches from Stock.
	F. 112—Packing Slip.
	F. 139—Stocktaking Slip.
	F. 160—Interdepartmental Delivery Note.

F. 111—Warehouse Daily Report of Despatches from Stock.

PAGE	FORM
IV D. 318 Warehouse Stock Control.	F. 110—Warehouse Stock Control Book.
VI B. 474 Cost Allocation Routine.	F. 112—Packing Slip.

Code Word.....Design Ref.....																
Description.....Catalogue Ref.....																
Requisition.			Stock Manufacturing or Purchase Order.			Stock Received.				Rotation No.	Advance Appropriation.			Despatches.		
Ref.	Date.	Quan.	Ref.	Date.	Quan.	W.P. No.	G.R. No.	Date.	Quan.		Date.	Office Order No.	Customer.	Delivery promised.	Ref.	Date.
										0						
										1						
										2						

Warehouse
Stock Control
Book.
(Loose leaf.)

This stock record is devised to deal with warehouse stock (complete product and spare parts) by taking up a separate line for each item received, hence the consecutive rotation Nos. These rotation Nos. serve equally for items appropriated in advance. A tick against each rotation No. indicates the receipt of the respective items. The references of delivery (W.P. for Works Product Note, and G.R. for Goods Received Note), date and total quantities are given. The marking of the rotation Nos. is in the nature of a graphic record, against which it is easy to set off the items appropriated and the items delivered—the balance representing margin of stock unappropriated. The appropriation may more than absorb all the stock in hand. The rotation Nos. will continue from sheet to sheet under the same design reference. The rotation No. must not be confused with the progressive No. The latter is actually applied to the product as completed (not usually to spare parts), and only when orders are filled in absolute sequence of receipt is the progressive No. likely to agree with the rotation No. in any given case, hence a separate column for the particular "pro. No." of the item used to satisfy the appropriations appearing against the rotation Nos. Purchase orders for warehouse stock are notified to the Warehouse by the General Stores by Departmental Memorandum (F 106). The Warehouse will requisition the Works Office (Production Section) for further stock by means of these memorandums

Date

Design Ref.	Ex.		Pro. No. (if any).	Despatched under Office Order No.	Quantity Analysis under classes of product.					Noted for Works Accounts.
	Stock Mfg. Order.	Purchase G.R. No.								

F. 111
Warehouse
Daily Report
of Despatches
from Stock.

This report is essentially for accounting purposes, and passes to the Works Accounts Office. It can conveniently be made a medium for analysing the quantities sold of each specified class of product—these being reported to the management in fortnightly totals. The form is in carbon duplicate, one copy remaining in the Warehouse for reference. Size of form according to extent of analysis.

CROSS REFERENCES.

F. 112—Packing Slip.

PAGE
IV E. 325 Despatch Routine.

FORM
F. 12—Office Order—Sales.
F. 51—Sales Sundries Order Specification.
F. 52—Individual Order Production Chart.
F. 99—Inspection Certificate.
F. 110—Warehouse Stock Control Book.
F. 111—Warehouse Daily Report of Despatches from Stock.
F. 113—Advice of Despatch.
F. 132—Cost Ledger.
F. 138—Delivered Orders Cost Abstract.

F. 113—Advice of Despatch.

(Despatch Note.)
(Advice of Returns.)

PAGE
I D. 22 Sales Management.
III H. 263 Works Patrols.
IV C. 296 Returnable Packages.
IV C. 297 Rejections and Replacements.
IV D. 317 Identification of Works Product.
IV D. 322 Sales Order Routine.
IV E. 325 Despatch Routine.
IV E. 328 Transport by Works Vehicle.
IV E. 329 Packages.
VI B. 460 Returnable Packages Account.

FORM
F. 24—Gate Pass.
F. 36—Away Expenses Sheet.
F. 84—Returnable Package Card.
F. 112—Packing Slip.
F. 114—Outwards Package Tracing Card.
F. 117—Works Accounts Register (III.)
—Purchase Credits.
F. 122—Suppliers' Package Record.
F. 165—Credit Claim Note.

F. 114—Outwards Package Tracing Card.

PAGE
IV E. 329 Packages.

FORM
F. 84—Returnable Package Card.
F. 113—Advice of Despatch.

P.S.		
Consignee.		Consignee's Ref.
		Office Order No.
Quantity.	Description of Goods.	Net Weight.
		Cwts. Qrs. Lbs.

Inspected and checked by Packed by

The above goods should be examined before being signed for. If this is not possible, sign for as "UNEXAMINED." In case of damage it is most important to notify us and the carriers immediately. No claim for short weight will be allowed unless an opportunity is afforded us of seeing the goods re-weighed.

These slips are intended for sending with each package, preferably in an envelope label or under the address label. The name of the sender is omitted from the form in case customer's labels are used for addressing packages. The slips are in triplicate, one remaining in Warehouse for reference, one going with package and one passing to General Office for invoicing purposes. In certain cases the slips may be printed with list of items pertaining to standard equipment. The papers for each day may be fastened together and lent to the Works Office for clearing the Progress Charts, Form 52, and to Works Accounts Office for entering on Delivered Orders Cost Abstract

Date..... A.D.	
To M.....	Consignee's Ref.
Per.....	Carr.
Packages. Value.	
Mark.	as per Packing Slip P.S. enclosed in Package Label. Please advise us and Carriers if goods not delivered promptly.
Measurements.	
Gross Weight. Cwts. Qrs. Lbs.	Carrier's Receipt.

These advices assume the use of Packing Slips (above) for giving the details, and constitute an advice mainly of the date and method of despatch, with sufficient description only as will allow one copy of the advice to serve as a consignment note for the carrier. There are two more copies, one remaining in the Warehouse, being signed by Carrier as acknowledgment of receipt, and the other going to the General Office for completing the invoice, and when that cannot be done the same day as goods are despatched, possibly as carbon copy of advice the particulars are noted on the General Office copy of Packing Slip, and the advice is posted separately to customer. The advice may be adapted for return of packages to supplier.

Length.	Breadth.	Depth.	Package No.....
Timber.	Thickness.	Finish.	Kind of Package.....
			To be charged at.....
Date sent.	A.D. No.	Consignee.	Date returned.

This card serves to record the travels of each package used for despatch purposes. The values may be fixed by means of a standard rate per square foot of surface according to the class of packages. These values may appear on Advice of Despatch, whether chargeable or not. Size of card may be 4" x 6".

F. 112

Packing Slip

F. 113

Advice of Despatch.

F. 114

Outwards Package Trading Card.

CROSS REFERENCES.

F. 115—Works Accounts Register—I.—Purchases and Disbursements.

PAGE	FORM
I F. 66 Administrative Statistics.	F. 82—Goods Received Note.
V G. 383 Stock Ledger.	F. 120—Cash Report to Works.
VI B. 455 Purchase Invoices.	F. 121—Disbursements Book.
VI B. 459 Disbursements.	F. 123—General Stock Ledger.
	F. 126—Component Stock Ledger.
	F. 129—Cost Allocation Card (I.).

See note below.

F. 116—Works Accounts Register—II.—Wages and Works Product.

PAGE	FORM
VI B. 463 Wages Allocation.	F. 32—Wages Abstract or Summary.
	F. 118—Process Product Summary.
	F. 119—Finished Stock Product Summary.
	F. 120—Cash Report to Works.

See note below.

F. 117—Works Accounts Register—III.—Purchase Credits.

PAGE	FORM
VI B. 460 Returnable Packages.	F. 113—Advice of Despatch (Returns Note).
VI B. 461 Purchase Credits.	F. 122—Suppliers' Package Record.
	F. 123—General Stock Ledger.
	F. 126—Component Stock Ledger.
	F. 165—Credit Claim Note.

The following cross references are common to F. 15, 116, and 117—

PAGE	
VI A. 412 General Scheme of Cost Accounts.	
VI A. 444 Diagram of Cost Accounting Stages.	
VI B. 452 Cost Allocation Principles.	
VI B. 476 Cost Allocation Agreement.	
VI G. 568 Interlocking of Cost Accounts with Financial Accounts.	

Fortnight ending.....												
PURCHASES.										DISBURSEMENTS.		
Inv. No.	Date.	Sup-plier.	G.R. Ref.	In-voice Total.	Return-able Pack-ages.	Stock Ledger Ref.	General Stock A/c.	Com-ponent Stock A/c.	Cost Allocation Ref.	Pur-chases charged direct.	D.B. Ref. or Cash Report Ref.	Amt.

F. 115

Works
Accounts
Register—I.
Purchases and Disbursements.

Fortnight ending									
WAGES.					WORKS PRODUCT.				
Wages Summary Week ending.	Cash Report to Works Ref.	Total.	Time Wages.	Extra Pay and Special Allowances.	Summary Sheet Ref.	Total.	Process Product charged direct.	General Stock A/c.	Com-ponent Stock A/c.

F. 116

Works
Accounts
Register—II.
Wages and Works Product.

Fortnight ending										
PURCHASE CREDITS.										
Credit Claim Ref.	Returns Note Ref.	Date.	Supplier.	Total.	Return-able Pack-age.	Stock Ledger Ref.	General Stock A/c.	Com-ponent Stock A/c.	Cost Allocation Ref.	Purchases charged direct.

F. 117

Works
Accounts
Register—III.
Purchase Credits.

This book is illustrated as being in three parts with supplements overleaf, and should be arranged on removable sheets. It will usually be more convenient to have the parts on separate sheets to allow of independent posting, but one sheet may be arranged for two or more parts. The function of the book is discussed in Section VI B, and little needs adding here as to routine. The invoices are entered after being agreed in all particulars, and take up consecutive Nos. The disbursements will involve either an invoice ref. or a Cash Report to Works ref. (Form F 120), and to pass the disbursement invoice an entry in the Disbursements Book (F 121), duly approved, is necessary. Purchases may occasionally come through a Cash to Works Report, if cash purchases of material are made, the report ref. then appearing in lieu of an invoice No. In the matter of entries in Works Product, those on Form F 116 constitute a grand summary of the details appearing on Forms F 118 and F 119. Size of form according to arrangement of parts.

CROSS REFERENCES.

F. 118—Process Product Summary.

PAGE	FORM
I F. 66 Administrative Statistics.	F. 71—Casting Delivery Sheet.
VI A. 444 Diagram of Cost Accounting Stages.	F. 73—Foundry Daily Work Sheet.
VI B. 453 Cost Allocation Principles.	F. 77—Forging Delivery Sheet.
VI D. 505 Process Cost Allocation.	F. 78—Smithy Daily Work Sheet.
VI D. 515 Rating of Process Products.	F. 116—Works Accounts Register (II.).
VI F. 561 Process Metal Accounts.	F. 123—General Stock Ledger.
VI G. 579 Cost Ledger.	F. 126—Component Stock Ledger.
	F. 161—Works Product Abstract.

F. 119—Finished Stock Product Summary.

PAGE	FORM
I F. 66 Administrative Statistics.	F. 83—Acknowledgment of Goods Received.
IV C. 292 Stock Classification.	F. 87—Shop Credit Slip.
IV C. 297 Non Purchase Receipts.	F. 97—Progress Ticket.
V G. 379 Returns from Shops and By-Products.	F. 108—Works Product Note.
V G. 383 Stock Ledger.	F. 116—Works Accounts Register (II.).
VI A. 444 Diagram of Cost Accounting Stages.	F. 123—General Stock Ledger.
VI B. 453 Cost Allocation Principles.	F. 126—Component Stock Ledger.
VI C. 493 Scrap Stock Values.	F. 132—Cost Ledger.
VI E. 519 Purpose of Stock Production Accounts.	F. 160—Interdepartmental Delivery Note.
VI F. 560 Scrap Stock Accounts.	F. 161—Works Product Abstract.
VI F. 561 Sales Returns Stock Account.	
VI G. 579 Cost Ledger.	

Dept.								Sheet No. FF.		
Fort-night ending.	Delivery Sheet No.	Metal Charges.	Process Charges.	Daily Work Sheet No.	Wages.	Shop Charges.	Total for Period.	Works Expenditure Analysis.		
								Process Product charged direct.	General Stock A/c.	Component Stock A/c.

F. 118

Process
Product
Summary.

This summary of process product has reference to the product of Iron Foundry, Brass Foundry, Smithy and any other department dealt with in the accounts on the lines discussed in Section VI b. The summary is of sheet totals appearing on Forms F 71 and F 73 (Foundry) and Forms F 77 and F 78 (Smithy). The totals for the fortnight are posted from here to the Works Accounts Register, Form 116, and are made the subject of a Works Product Abstract for the purposes of the financial accounts. The works expenditure analysis is under three heads. The first, process products charged direct, means that the process costs as figured out on the respective delivery and work sheets are allocated direct to the original office order under which the work was carried out. Such office orders may be stock manufacturing orders, the product of which does not pass into stock until finished. In other cases the process products may pass direct into stock as rough castings or forgings. Where such product refers to components, the analysis will be under "Component Stock A/c," whereas such product as plain cast iron or cast bronze b'r will pass into the "General Stock A/c."

Sheet No. S.P.									
Fort-night ending	Delivery Ref.	Stock Mfg. Order.	Short Description of Goods.	Quan.	Works Value.		Posted Stock Ledger.	Wks. Expend. Analysis.	
	Works Product Note, Shop Credit Slip, Goods Acknowledgment.				Rate.	Amount.		General Stock A/c.	Component Stock A/c.

F. 119

Finished
Stock Product
Summary.

This summary is largely parallel to the Process Product Summary above, but relates to stock product other than process product, and for the most part to product made under stock manufacturing orders. The summary is built up, as to manufactured stock product, from the Works Product Notes (F 108). While the items will probably refer mainly to component stock (whether as loose components, assembly units or complete product), there may be cases of items made for general stock (see Classification, Section IV c), such as utensils and implements. Scrap material recovered from the shops, as swarf and defective material passing into stock as scrap, will be entered up here from the respective Shop Credit Slips (F 87)—the scrap constituting fresh material from the stock accounting point of view (see discussion, Section V g), and this material is in effect a works by-product.*

This summary is conveniently used also for entering up goods returned into stock by customers or agents, and by this practice the works materials account becomes charged with the new material, and through the financial accounts the costs of sales is reduced according to the works value of the goods returned. This is quite apart from crediting the customer or agent in respect to the return (see discussion, Section IV c). The information as to goods returned into stock will be conveyed by the Acknowledgment of Goods Received.

* A separate sheet for these scrap entries will allow their direction under "Scrap, credited to Orders" and "Scrap not credited to Orders." The sum total constitutes the value charged into stock.

CROSS REFERENCES.

F. 120—Cash Report to Works.

PAGE
 I C. 39 Construction of Estimates.
 VI B. 452 Cost Allocation Principles.
 VI B. 458 Purchase Invoices.
 VI B. 459 Disbursements.
 VI B. 473 Cost Allocation Routine.

FORM
 F. 32—Wages Abstract.
 F. 35—Special Pay Ticket.
 F. 36—Away Expenses Sheet.
 F. 115—Works Accounts Register (I)—
 Disbursements.
 F. 116—Works Accounts Register (II)—
 Wages.
 F. 121—Disbursements Book.
 F. 129—Cost Allocation Card (I)—Dis-
 bursements Charged Direct.

F. 121—Disbursements Book.

PAGE
 I C. 39 Construction of Estimates.
 VI B. 459 Disbursements.
 VI B. 474 Cost Allocation Routine.

FORM
 F. 82—Goods Received Note.
 F. 115—Works Accounts Register (I.)—
 Disbursements.
 F. 120—Cash Report to Works
 F. 129—Cost Allocation Card (I)—Dis-
 bursements Charged Direct.

F. 122—Suppliers' Package Record.

PAGE
 VI B. 460 Returnable Packages.

FORM
 F. 82—Goods Received Note.
 F. 84—Returnable Package Card.
 F. 113—Advice of Despatch.
 F. 117—Works Accounts Register (III)
 Purchase Credits.
 F. 133—Cost Transfer Journal.
 F. 165—Credit Claim Note.

No. Date								
Date.	Voucher No.	Name.	Particulars.	Chargeable to.	Cash Disbursements.	Wages.	Cash Purchases.	Noted Works A/cs.

F. 120

Cash Report to Works.

This report serves as a summary of all cash payments by the Financial Dept. that have to be accounted for in the works accounts. The reports are furnished weekly to the Works Accounts Office and entered up in the Works Accounts Register on the one hand, and in the case of cash disbursements and cash purchases are allocated from the reports to the respective cost allocation accounts. Salaries will be entered under "Cash Disbursements," the allocation being given without disclosing names. Disbursements and ledger purchases are not included in these reports, the invoices pertaining to every such item being independently dealt with. Size of form may be 13" x 8".

Rotation No.	Date.	Name.	Particulars.	Chargeable to.	Amount.	Passed by.	Inv. No.	Noted Works A/cs.

F. 121

Disbursements Book.

This book serves as a record of disbursements that are not of a petty non-recurring character. The only dividing line perhaps is payments by cheques instead of through petty cash. This record serves the functions of a Goods Received Note (F 82) in passing the invoice covering the prospective disbursement. The entry as to invoice No. indicates that the item has been duly entered in the Works Accounts Register. Size of sheet may be 13" x 8".

Only Returnable Packages to be entered.							Year. Supplier.....				
G.N. No.	Date.	Inv. Date.	Particulars.	Quan.	Rate.	Amount charged.	Returns.				Appropriated for Other Purposes.
							Date.	Advice Ref.	Quan.	Value.	

F. 122

Suppliers' Package Record.

These records are made up in the Works Accounts Office from the invoices, and this office is responsible for seeing that all packages are accounted for. Returnable Package Cards (F 84) are made out for each lot received, possibly for each package received. The returns are reported by an Advice of Despatch (F 113), suitably endorsed, whereby the suppliers from their copy understand that credit has been taken to the values named for the packages returned. These values are entered accordingly by the Works Accounts Office from their copies into the Works Accounts Register—third part (F 117)—and also on to these records against the item originally charged. The appropriation of suppliers' packages for other purposes, such as sales, is advised to the Works Accounts Office by means of the Returnable Package Card. If adjustment is deemed necessary in the works accounts, this can be effected by an entry in the Cost Transfer Journal (F 133), deducting from Returnable Packages (this adjustment will be made in the Works Accounts Register itself), and adding to "Purchases Charged Direct" or "General Stock," whichever may seem more convenient for allocation to the office orders to which the packages are to be finally charged. Size of form may be 8" x 6½".

CROSS REFERENCES.

F. 123—General Stock Ledger.

PAGE		FORM	
I F. 66	Administrative Statistics.	F. 76—	Foundry Weekly Material Report.
IV C. 289	Stock Classification.	F. 77—	Forging Delivery Sheet.
IV C. 313	Returns from Shops—Stock Control.	F. 82—	Goods Received Note.
V G. 374	Stock Checking or Scrutiny.	F. 86—	Goods Issue Voucher.
V G. 378	Returns from Shops and By-Products—Stock Accounts.	F. 87—	Shop Credit Slip.
V G. 382	Stock Ledger.	F. 89—	Stock Control Card (General).
V H. 396	Valuation of General Stock.	F. 115—	Works Accounts Register (I.)—Purchases.
VI A. 444	Diagram of Cost Accounting Stages.	F. 117—	Works Accounts Register (III.)—Purchase Credits.
VI C. 497	Works Sundry Accounts.	F. 118—	Process Product Summary.
		F. 119—	Finished Stock Product Summary.
		F. 124—	General Stock Rate Card.
		F. 125—	Stock Issue Abstract.
		F. 139—	Stocktaking Slip.
		F. 140—	Stock Inventory Sheet.

F. 124—General Stock Rate Card.

PAGE		FORM	
IV C. 289	Stock Classification.	F. 82—	Goods Received Note.
V G. 372	Accuracy in Stock Accounts.	F. 123—	General Stock Ledger.
V G. 380	General Stock Rate Records.	F. 130—	Cost Allocation Card (II.)—Stock Issues.
		F. 140—	Stock Inventory Sheet.

F. 125—Stock Issue Abstract.

PAGE		FORM	
V G. 380	General Stock Rate Records.	F. 86—	Goods Issue Voucher.
V G. 383	Stock Ledger.	F. 88—	Timber Ticket.
VI B. 454	Material Allocation.	F. 89—	Stock Control Card (General and Component).
VI B. 474	Cost Allocation Routine.	F. 123—	General Stock Ledger.
		F. 126—	Component Stock Ledger.
		F. 130—	Cost Allocation Card (II.)—Stock Issues.

[illegible]

The routine pertaining to the Stock Ledger is discussed in Section V g, where the matter of stock scrutiny is also discussed. The balances from the various Stock Control Cards (F 89), corresponding with any one stock class in the stock ledger, are posted here from time to time in the course of the stock scrutiny, and extended at the stock rate by way of comparing the Stock Ledger balances with the Stock Control Card balances, although kept in terms of quantity only. The further stage of stock scrutiny is to verify, by actual weighing or count, that the stock in hand agrees with the stock control card balances. The receipts are entered in the ledger from the respective Goods Received Notes (F 82), while, to save space in the ledger, the issues are summarised on Stock Issue Abstracts (below). The returns are derived from Shop Credit Slips (F 87). Size of ledger sheet (removable type) may be 8" x 13".

[illegible]

F. 123
General Stock
Ledger.
(Loose leaf.)

F. 124.
General Stock
Rate Card.

F. 125
Stock Issue
Abstract.

CROSS REFERENCES.

F. 126—Component Stock Ledger.

PAGE		FORM	
V G. 374	Stock Checking or Scrutiny.	F. 39—	Standard Fittings Sheet.
V G. 378	Returns from Shops.	F. 71—	Casting Delivery Sheet.
V G. 382	Stock Ledger.	F. 77—	Forging Delivery Sheet.
V I A. 444	Diagram of Cost Accounting Stages.	F. 82—	Goods Received Note.
		F. 86—	Goods Issue Voucher.
		F. 87—	Shop Credit Slip.
		F. 89—	Stock Control Card (Component).
		F. 101—	Assembling Sub-Order.
		F. 102—	Erecting Sub-Order.
		F. 108—	Works Product Note.
		F. 111—	Warehouse Report of Despatches.
		F. 115—	Works Accounts Register (I.).
		F. 117—	Works Accounts Register (III.).
		F. 118—	Process Product Summary.
		F. 119—	Finished Stock Product Summary
		F. 123—	General Stock Ledger.
		F. 125—	Stock Issue Abstract.
		F. 127—	Rough Component Rate Card.
		F. 128—	Finished Component Rate Card.
		F. 139—	Stocktaking Slip
		F. 140—	Stock Inventory Sheet.
		F. 160—	Interdepartmental Delivery Note.

F. 127—Rough Component Rate Card.

PAGE		FORM	
I C. 40	Construction of Estimates.	F. 69—	Casting Instruction.
V G. 377	Timber Stock Accounts.	F. 71—	Casting Delivery Sheet.
V G. 380	Stock Product Rates.	F. 73—	Foundry Daily Work Sheet.
V I D. 503	Process Cost Allocation.	F. 77—	Forging Delivery Sheet.
V I D. 515	Rating of Process Products.	F. 78—	Smithy Daily Work Sheet.
V I E. 519	Stock Production Accounts.	F. 126—	Component Stock Ledger.
V I G. 565	Nature of Cost Returns.	F. 128—	Finished Component Rate Card.
		F. 130—	Cost Allocation Card (II.)— Stock Issues.

F. 128—Finished Component Rate Card.

PAGE		FORM	
I C. 41	Construction of Estimates.	F. 61—	Job Record Sheet.
V G. 372	Accuracy in Stock Accounts.	F. 63—	Component Cost Comparison Card.
V G. 380	Stock Product Rates.	F. 126—	Component Stock Ledger.
V I B. 469	Production Preparation Costs.	F. 127—	Rough Component Rate Card.
V I D. 500	Purpose of Process Accounts.	F. 130—	Cost Allocation Card (II.)— Stock Issues.
V I E. 520	Purpose of Stock Production Accounts.	F. 132—	Cost Ledger.
V I E. 525	Rating of Finished Stock Product.	F. 140—	Stock Inventory Sheet.
V I G. 565	Nature of Cost Returns.		

Description.....													
SCRAP.				RECEIPTS.					ISSUES.				
V.R. No.	Date.	Quan.	Cause.	Del'y Sheet	Date.	Quan.	Rate.	Value.	Total to date.	Date.	Quan.	Value.	Total to date.
				Product Note.									
Headings continued													
RETURNS.					Design Ref.....								
Shop Credit Sup.	Date.	Quan.	Value.	Total to date.	Stock Ledger Balance.	STOCK CONTROL CARD BALANCE.							
						Date.	Quan.	Rate.	Value.	Notes.			

This ledger differs little from the General Stock Ledger (F 123). There is an additional set of columns for noting the items scrapped in process of manufacture. These entries are apart from the ledger proper, and are for keeping in view the quantity of scrap involved in each case, so that proper consideration shall be given to this aspect in fixing the stock rates to be used. Separate ledgers are necessary for component stock in the General Stores (rough and finished), and in the Warehouse (spare parts and complete products). Standard fittings constitute a division of finished components, and might appear in both ledgers. Assuming a removable sheet ledger, distinctive colour sheets may be used for rough and finished components. It is to be understood that components made under a Stock Manufacturing Order, which do not pass into stock until erected as complete products, will not appear as loose components through this ledger. They will be collected at the Work Depot and passed out for assembling under the same office order No. but under distinct Assembling and Erecting Sub-Orders (F 101 and F 102). Stock receipts will be notified to the Works Accounts Office by Delivery Sheets (F 71 and F 77) in the case of rough components (castings and forgings), and by Works Product Notes (F 108) in the case of finished components and complete products. Stock issues will be notified by Goods Issue Vouchers (F 86), and Warehouse Daily Report of Despatches from Stock (F 111). These will be summarised on Stock Issue Abstract (F 125), as in the case of the General Stock Ledger.

Material..... Name..... Part No.....												
Office Order.	Process Inst'n.	Quan.	Metal Charge.	Process Charge.	Wages.	Shop Charges.	Total Cost.	Average Cost.	Date.	Average to date.	Scrap %.	Rate adopted.

This rate card is for building up cost of castings and forgings from delivery sheets (F 71 and F 77) and daily work sheets (F 73 and F 78). The costing need not be carried out for every batch made. The percentage addition to cover cost of scrap must be derived from experience in each case—the notes entered in the stock ledger (above) serving as a basis.

Material..... Name..... Design Ref.....													
Office Order.	Sub-Order.	Quan.	Material	Dis-burse-ments.	Wages.	Shop Charges.	Total Cost.	Average Cost.	Date.	Average to date.	Tool %.	Scrap %.	Rate adopted.

This rate card collates the cost data under the sub-orders as recorded in the cost allocation accounts (F 129, F 130, and F 131). The material costs may have to be abstracted from the respective office order costs. The resultant cost figures should be compared with those on the Component Cost Comparison Cards (F 63), as kept in the Works Office (Ratefixing Section). The percentage addition to cover cost of drawings, patterns, jigs and special tools (called on form, Tool %) will depend on quantity over which these preliminary costs are to be spread. For scrap percentage see F 127. Casehardening to be allowed for when necessary.

F. 126

Component
Stock Ledger.
(Loose leaf.)

F. 127

Rough Com-
ponent Rate
Card.

F. 128

Finished Com-
ponent Rate
Card.

CROSS REFERENCES.

F. 129—Cost Allocation Card—I.—Materials and Disbursements Charged Direct.

PAGE	FORM
IV C. 309 Component Stock.	F. 71—Casting Delivery Sheet.
VI B. 453 Material Allocation.	F. 73—Foundry Daily Work Sheet.
VI B. 456 Purchase Invoices.	F. 77—Forging Delivery Sheet.
VI B. 459 Disbursements.	F. 78—Smithy Daily Work Sheet.
VI B. 473 Cost Allocation Routine.	F. 82—Goods Received Note.
VI D. 515 Rating of Process Products.	F. 86—Goods Issue Voucher.
	F. 115—Works Accounts Register (I.).
	F. 120—Cash Report to Works.
	F. 121—Disbursements Book.

*See note below.**F. 130—Cost Allocation Card—II.—Stock Issues.*

PAGE	FORM
IV C. 312 Issue of Stock.	F. 76—Foundry Weekly Material Report
IV C. 313 Returns from Shops.	F. 86—Goods Issue Voucher.
V G. 383 Stock Ledger.	F. 88—Timber Ticket
VI B. 474 Cost Allocation Routine.	F. 124—General Stock Rate Card.
VI B. 497 Cost Allocation Differences.	F. 125—Stock Issue Abstract.
	F. 127—Rough Component Rate Card.
	F. 128—Finished Component Rate Card.

*See note below.**F. 131—Cost Allocation Card—III.—Wages.*

PAGE	FORM
VI B. 450 Cost Allocation Principles.	F. 28—Weekly Time Allocation Sheet.
VI B. 463 Wages Allocation.	F. 29—Extra Pay Slip.
VI B. 466 Net Production Costs.	
VI B. 475 Cost Allocation Routine.	
VI C. 497 Cost Allocation Differences.	

The following cross references are common to F. 129, 130 and 131—

PAGE	FORM
VI A. 444 Diagram of Cost Accounting Stages.	F. 59—Tool Order.
VI B. 452 Cost Allocation Principles.	F. 96—Plant Order.
VI B. 464 Cost Allocation Requirements.	F. 101—Assembling Sub-Order.
VI C. 478 Standing Orders.	F. 102—Erecting Sub-Order.
VI D. 501 Process Cost Allocation.	F. 103—Daily List of Machining Sub-Orders Issued.
	F. 132—Cost Ledger.
	F. 133—Cost Transfer Journal.
	F. 162—Works Cost Allocation Abstract.
	F. 166—Mechanical Tabulation Ticket.

Sheet No.						Section.	Office Order No.		
Receipt Ref.	Date.	Supplier.	Description.	Sub-Order Ref.	Quan.	Rate.	Purchases charged direct.	Process Products charged direct.	Disbursements.

F. 129

Cost Allocation Card—I.

Direct Materials and Disbursements.

Sheet No.						Section.	Office Order No.			
Issue Ref.	Date.	Description.	Sub-Order Ref.	Quan.	Rate.	General Stock.		Component Stock.		
						Direct Material.	Secondary Material.	Rough.	Finished.	Standard Fittings.

F. 130

Cost Allocation Card—II.

Stock Issues.

Short Description.....			Quan.	Design Ref.	Office Order No.	Section.	Date.	Dept.	Sub-Order No.

Week No.	Check No.	Process.	Wages.				Shop Charges.	Week No.	Check No.	Extra Pay.		Special Allowances.
			Overtime Charges.	Machine.	Hand.	Secondary.				Machine.	Hand.	

F. 131

Cost Allocation Card—III

Wages.

These three forms embody the routine discussed in detail in Section VI B, and reference thereto is necessary. The forms are so arranged that in the stages (I. and II.), dealing with materials, no sub-division of accounts under sub-order Nos. is assumed. Whereas for wages and shop charges (stage III) the assumption is that there will be a separate card for each sub-order. These cards will be opened from the Daily List of Sub-Orders Issued (F 103), and from the Works Accounts Office copies of Tool, Plant, Assembly and Erecting Sub-Orders (F 59, F 96, F 101 and F 102). There is nothing to prevent these cards being applied to the whole office orders, and in the case of standing orders (see Section VI c), this will be necessary in many cases. Conversely, separate accounts for sub-orders may be kept in regard to material (stages I. and II.), as will be almost imperative in the case of plant sub-orders for new work (N series) to enable the Plant Sub-Orders Cost Summary (F 137) to be prepared. It should be kept in mind that there may be sectional costs under office order references apart from sub-orders, which obviously must fall under one or other sectional account. The sections assumed to be a minimum are Net Production Costs, Costs of Drawings, Patterns, Jigs, and Special Tools, Costs of Errors and Defects, Costs of Final Inspection, Packing and Despatch (see discussion, Section VI B). These sections should be given letter symbols to simplify reference. In regard to stage I., purchases charged direct will be posted from the Goods Received Notes (F 82), after same have been completed from the invoices, and possibly supported by Goods Issue Vouchers (F 86) confirming the allocation. In the case of process products charged direct, the allocation will be derived in part from the Casting and Forging Delivery Sheets (F 71 and F 77), and in part from the Foundry and Smithy Daily Work Sheets (F 73 and F 78). Disbursements will be entered from the Cash Reports to Works (F 120) and Disbursements Book (F 121). In regard to stage II., the issue ref. will be Goods Issue Vouchers and the like. The allocation comprised in stage III. will be derived from the Weekly Time Allocation Sheets (F 28) as to wages, hence the sequence of the headings, and from the carbon copy of the Extra Pay Slip (F 29) as to extra pay and through a similar channel as to special allowances. In posting the fortnightly totals from these sheets and cards to the Cost Ledger, a rubber stamp may be usefully applied to, bracket the column totals covered under one head in the ledger, and at the same time to stamp the fortnight ending date.

CROSS REFERENCES.

F. 132—Cost Ledger.

PAGE	FORM
V.H. 398 Valuation of Work in Progress.	F. 10—Estimate and Cost Comparison Sheet.
VIA. 444 Diagram of Cost Accounting Stages.	F. 112—Packing Slip.
VIB. 464 Cost Allocation Requirements.	F. 119—Finished Stock Product Summary.
VIC. 496 Expenditure Suspense Account.	F. 128—Finished Component Rate Card.
VIR. 519 Purpose of Stock Production Accounts.	F. 129—Cost Allocation Card (I.).
VIF. 555 Production Oncosts Accounts.	F. 130—Cost Allocation Card (II.).
VIF. 562 Stock Production Differences Account.	F. 131—Cost Allocation Card (III.).
VIG. 570 Interlocking of Cost Accounts with Financial Accounts.	F. 133—Cost Transfer Journal.
VIG. 577 Cost Ledger.	F. 134—Production Oncosts Book (Shop Charges).
	F. 137—Plant Orders Cost Summary.
	F. 138—Delivered Orders Cost Abstract.
	F. 142—Work-in-Progress Inventory Sheet.
	F. 162—Works Cost Allocation Abstract.
	F. 164—Works Profit and Loss Account.

F. 133—Cost Transfer Journal.

PAGE	FORM
VIB. 469 Production Preparation Costs.	F. 98—Viewing Report.
VIB. 469 Errors and Defects.	F. 122—Suppliers' Package Record.
VIG. 581 Cost Transfers.	F. 129—Cost Allocation Card (I.).
	F. 130—Cost Allocation Card (II.).
	F. 131—Cost Allocation Card (III.).
	F. 132—Cost Ledger.
	F. 137—Plant Orders Cost Summary.
	F. 162—Works Cost Allocation Abstract.

Short Particulars.....											
Cost Section.	Fortnight ending	Sub-Order No.	Cost Allocation.					Cost Transfers.			Total for Period
			Stage.	Ref.	Materials.	Disbursements.	Wages.	Shop Charges.	Ref.	Short Particulars.	

Headings continued.

.....Estimated Total Cost.....						Office Order No.....				
Total to Date.	Reported for Financial a/c Works Cost Allocation Abstract.	Entered Shop Charges Book.	Deliveries.				Delivered Orders Cost Abstract.			Balance.	Notes.
			Ref.	Quan.	Rate.	Works Value.					

The cost ledger is a summary of the cost allocation figures as collected on the Cost Allocation Cards (F 129, F 130 and F 131). The postings are made fortnightly, and the headings in the ledger conform to those in the financial accounts. The ledger is used for effecting transfers of costs, and for marking off the works value of deliveries so as to show the balance or book value of the work in progress, if order not completed. The works values of deliveries are summarised on a Delivered Orders Cost Abstract (F 138), and this will usually be identical with the cost figures. In stock production orders there may be a balance representing either an over-charge (profit) or under-charge (loss), which is posted to the Shop Charges Book (F 134) (see discussion, Section VI e). The works value of stock product are entered on the Finished Stock Product Summary. In the case of Standing Orders, the cost ledger totals are mostly posted to the Shop Charges Book. Provision is made on the form for noting the total allocations reported to the Financial Dept. for their accounts, by means of the Works Cost Allocation Abstract. The costs of sales of warehouse stock may be grouped for each fortnight under the several sales classes, without attempting separate ledger or even allocation accounts for each sales orders. In apportioning the ledger sheets to the several cost sections under each office order ref., the net production costs may be allotted the front side of the sheet and the three other sections (see notes to Form F 130) may have the reverse side between them. Size of form may be 8" x 13".

Sheet No.....											
Fortnight ending.	Ref.	Particulars.	Cost Allocation Division Totals.			Total Costs.	Credits.		Debits.		Passed by
							Transfer from Office Order Sect.	Posted.	Transfer to Office Order Sect.	Posted.	
			M. D. W. S.C.								
			M. D. W. S.C.								

The question of cost transfers is discussed in Section VI c. They are effected in the Cost Ledger, and, inasmuch as the total allocations that have to be reported for the financial accounts are altered, as to group totals, by the transfers, it is essential to split up the transfers under the heads of material, disbursements, wages and shop charges; hence the provision indicated in the Cost Transfer Journal for entering the figures under these divisions. The entries under "Cost Transfers" in the Cost Ledger must carry the same notes, and then, when the fortnightly totals have been made of the regular allocations, the transfers are detailed under the "Cost Allocation" heads—in red for credits—and a new total made for the purposes of the Works Cost Allocation Abstract. Size of form may be 13" x 8".

F. 132

Cost Ledger.
(Loose leaf.)

F. 133

Cost Transfer
Journal.

CROSS REFERENCES.

*F. 134—Production Oncosts Book.**(Production Oncosts Ledger.)**(Shop Charges Book.)*

PAGE		FORM	
VIA. 444	Diagram of Cost Accounting Stages.	F. 132—Cost Ledger.	
VIB. 459	Disbursements.	F. 135—Works Expenses Apportionment Report (I.).	
VIC. 496	Expenditure Suspense Account.	F. 136—Works Expenses Apportionment Report (II.).	
VID. 507	Metal Costs—Iron Foundry.	F. 163—Works Accounts Annual Abstract.	
„ 510	Metal Costs—Smithy.	F. 164—Works Profit and Loss Account.	
„ 515	Rating of Process Products.		
VI E. 519	Purpose of Stock Production Accounts.		
VI F. 555	Production Oncosts Accounts.		
VIG. 578	Cost Ledger.		

*F. 135—Works Expenses Apportionment Report (I.)
Departments.*

PAGE		FORM	
I F. 67	Administrative Statistics.	F. 134—Production Oncosts Book (Shop Charges).	
VIA. 444	Diagram of Cost Accounting Stages.		
VI F. 543	Apportionment of Works Expenses to Departments.		
VI F. 555	Production Oncosts Accounts.		
VIG. 565	Nature of Cost Returns.		

*F. 136—Works Expenses Apportionment Report (II.)
Sub-Departments or Sections.*

PAGE		FORM	
I F. 67	Administrative Statistics.	F. 30—Wages Allocation Weekly Summary.	
VIA. 444	Diagram of Cost Accounting Stages.	F. 134—Production Oncosts Book (Shop Charges).	
VI F. 546	Apportionment of Departmental Oncosts to Individual Producing Units.		
VI F. 555	Production Oncosts Accounts.		
VIG. 565	Nature of Cost Returns.		

Account.....					A/c. Ref.					Sheet No.....									
DEBITS.										CREDITS.									
Fortnight ending.	Ref.	Particulars.	Items.	Totals.	Fortnight ending.	Ref.	Particulars.	Items.	Totals.	Fortnight ending.	Ref.	Particulars.	Items.	Totals.					

The routine pertaining to this book is discussed in detail in Section VI F, and reference thereto is necessary. The source of the initial entries is the Cost Ledger (F 132) for the most part. Other entries will be derived from the Works Accounts Annual Abstracts (F 163). It is of prime importance that works accounts figures, agreeing in character with financial accounts figures, shall also agree in total, as, for example, depreciation on buildings and plant. Size of form may be 14½" x 10½", on removable sheets in a suitable binder.

F. 134

Production
Oncosts Book
(Loose leaf.)

Group or Service.....										Fortnight ending.....									
Standing Order No.	Particulars.	Total Costs as per Shop Charges Book.			Apportionment.														
					Dept.		Dept.		Dept.										
		Ref.	Amount.	Basis.	Amount.	Basis.	Amount.	Basis.	Amount.										

F. 135

Works
Expenses Ap-
portionment
Report. I.
(Departments.)

Fortnight ending.....									
Per Departmental Wages Allocation Summary	Dept.				Dept.				
	Machine.		Hand.		Machine.		Hand.		
Production Hours Week No.									
Proportions, Machine and Hand Ratio Depts. to whole Works									
Building Service									
Power " " "									
" Producing Unit " "									
Tool " "									
Material " "									
Departmental " "									
Administration " "									
Contingency " "									
Total Apportionment									
Average Rate per Production Hr.									

F. 136

Works
Expenses Ap-
portionment
Report. II.
(Sub Depts.)

The uses of this report, which is arranged here in two parts, are discussed in Section VI F. So far as the first part is concerned, the apportionment to departments, in regard to certain expenses, will have been recorded in the process of cost allocation by virtue of departmental sub-accounts under the standing order references. To a large extent the apportionment must be by formula adjusted as accurately as possible to meet the current conditions. For some expenses, the basis suggested in the discussion in Section VI F is the ratio of total departmental production hours to total production hours for whole works. These figures are derived from the Departmental Wages Allocation Summaries (F 30) and collated on the second part of the above report. Having arrived at the total apportionment of each class of expenses to each department, the matter is carried a stage further in departments employing both machine and hand producing units, by apportioning the departmental total between the two sections, machine and hand. Size of form must depend on number of departments to be provided for. Where one sheet to carry all depts. would be too wide, intermediate narrow sheets can be arranged so as to approximate to the idea of having the whole apportionment in view at one opening.

CROSS REFERENCES.

F. 137—Plant Orders Cost Summary.

PAGE		FORM	
VJ. 399	Plant Records.	F. 96—	Plant Order or Sub-order.
VJ. 404	Building and Fixed Plant Identification.	F. 132—	Cost Ledger.
VJ. 407	Treatment of Capital Expenditure.	F. 133—	Cost Transfer Journal.
VJ. 410	Control of Capital Expenditure.	F. 142—	Work - in - Progress Inventory Sheet.
VI A. 444	Diagram of Cost Accounting Stages.	F. 145—	Buildings and Fixed Plant Register.
VIB. 471	Works Capital Additions.		
VIC. 480	Works Capital Additions — Standing Orders.		
VIC. 481	Works Repairs — Standing Orders.		
VIC. 485	Plant Removals and Alterations.		
VIC. 497	Works Additions Costs Written Back.		
VIF. 558	Departmental Capital Values Account.		
VIF. 563	Production Oncosts Supplementary Account.		
VIG. 565	Nature of Cost Returns.		
VIG. 579	Cost Ledger.		

F. 138—Delivered Orders Cost Abstract.

PAGE		FORM	
IC. 35	Selling Prices.	F. 10—	Estimate Reference Sheet.
IF. 69	Administrative Statistics.	F. 11—	Tender Form.
VI A. 443	General Scheme of Cost Accounts.	F. 112—	Packing Slip.
VIA. 444	Diagram of Cost Accounting Stages.	F. 132—	Cost Ledger.
VIF. 562	Guarantee Expenditure Account.	F. 142—	Work - in - Progress Inventory Sheet.
VIG. 565	Nature of Cost Returns.	F. 164—	Works Profit and Loss Account.
VIG. 578	Delivered Orders Cost Abstract.		
VIG. 579	Cost Ledger.		

5-187.

PLANT SUB-ORDERS COST SUMMARY (N. Series).

W. B. & CO. LTD.

Plant Group.....

Plant Sub-Order.	Particulars.	For Dept.	Sub-Order Cost Allocation.					Costs Brought Forward.	Costs Carried Forward.
			Ma-terials.	Disab'ts.	Wages.	Shop Charges.	Total.		

Headings continued.

Group No.....Sheet No.....Fortnightending.....

FINAL ALLOCATION FOR COST LEDGER.

Alterations. A/c. Ref. S2-6.			Repairs. A/c. Ref. R.....			Additions. A/c. Ref. N.....			
Materials.	Disb.	Wages.	Materials.	Disb.	Wages.	Materials.	Disb.	Wages.	Shop Charges.

This summary is provided to allow the utmost discrimination to be used in regard to additions to capital values. All new work in connection with buildings and plant is made the subject of a Plant Sub-Order (F 96) in a series designated "N," or other symbol, to distinguish such orders from building and plant repairs which are here marked R. Purchases of plant items should be first authorised by a sub-order. The costs under "N" sub-orders are summarised each fortnight on this form in groups according to the class of plant (see classification, Section V). The costs of Uncompleted Sub-Orders may be carried forward without attempting final allocation until completed, except at the end of the financial year, when every item should be cleared. As the standing orders for works repairs (see Section VI c) are arranged to correspond with the groupings of works additions, it is a simple matter to collate in one set of columns all the "N" costs properly chargeable to repairs. This will occur with some renewals and alterations, while some alterations costs are neither additions nor repairs, and require to be charged to a general Alterations Account (Standing Order S2-6). A further function of this summary is to summarise those costs which exceed a reasonable valuation as capital additions. Those excesses arise the more from the inclusion of shop charges or production oncosts, but accuracy in the cost accounts generally demand their inclusion—see discussion on page 407.

5-188.

DELIVERED ORDERS COST ABSTRACT.

W. B. & CO. LTD.

Year.....Sheet No.....

Class No.....Class No.....

Fortnight ending.	Plant Order No.	Customer.	Particulars of Order.	Length of time on hand.	Cost Section Totals.				Total Works Cost.	Invoice Price.	% over % under		Notes.
					Net Production Costs.	Drawings, Patterns, Jigs, and Spec. Tools.	Errors and Defects.	Final Insp. Packing and Despatch.			Works Cost.		

This abstract is made up from the Cost Ledger (F-132) in accordance with orders delivered each fortnight (see F 112). The orders are classified in accordance with the classes adopted for the Sales Day Book. The function of the abstract is to present to the General Manager a concise survey of profitable and unprofitable business as the year proceeds. The sectional costs serve to guide future selling prices, as well as form the subject of investigation. The cost figures of completed orders are given in a more detailed summary form on the Estimate Reference Sheet (F 10) without, however, comparing costs against selling price. An extra column is required in the case of Sales Repairs and Sundries Orders for taking out guarantee costs. Costs and profits on sales from warehouse stock may be grouped for each fortnight in one total under the several classes. Size of form may be 5" x 8", and may be mounted in a guard book for privacy and safe custody.

The trading margin between works cost and net selling price has to be sufficient to meet commercial expenses and provide a profit. Refer percentage table, page 37.

F. 137

Plant Orders
(or Sub-Orders)
Cost
Summary.

F. 138

Delivered
Orders Cost
Abstract.

CROSS-REFERENCES.*F. 139—Stocktaking Slip.*

PAGE	FORM
IV C. 301 Wholesale and Retail Stock.	F. 89—Stock Control Card (General and Component).
V H. 389 Problem of Stocktaking.	F. 110—Warehouse Stock Control Book.
V H. 391 Preparations for Stocktaking.	F. 123—General Stock Ledger.
V H. 396 Valuation of General Stock.	F. 126—Component Stock Ledger.
	F. 140—Stock Inventory Sheet.

F. 140—Stock Inventory Sheet.

PAGE	FORM
V H. 389 Problem of Stocktaking	F. 123—General Stock Ledger.
V H. 392 Preparations for Stocktaking.	F. 124—General Stock Rate Card.
V H. 396 Goods on Loan.	F. 126—Component Stock Ledger.
V H. 396 Valuation of General Stock.	F. 127—Rough Component Rate Card.
	F. 128—Finished Component Rate Card.
	F. 139—Stocktaking Slip.
	F. 164—Works Profit and Loss Account.

F. 141—Work-in-Progress Slip (Stocktaking).

PAGE	FORM
V H. 389 Problem of Stocktaking.	F. 142—Work - in - Progress Inventory Sheet.
V H. 393 Preparations for Stocktaking.	

F. 142—Work-in-Progress Inventory Sheet.

PAGE	FORM
V H. 389 Problem of Stocktaking.	F. 132—Cost Ledger.
V H. 398 Valuation of Work-in-Progress.	F. 137—Plant Orders Cost Summary.
V H. 529 Purpose of Stock Production Accounts.	F. 138—Delivered Orders Cost Abstract.
V H. 580 Cost Ledger.	F. 141—Work-in-Progress Slip.
	F. 164—Works Profit and Loss Account.

Location.		Lot No.		Item Ref.	
Description.					
Material.		O.R. No.		Usefulness.	
Date.	Quan.	Cwts.	Qrs.	Lbs.	Certified.
Later Receipts. G.R.					
Later Issues.					
Balance at Stock-taking.					

These slips may be in the form of tallies if preferred. The slips are prepared well in advance of stocktaking as to all particulars other than quantities and weights. These are first entered when lot Nos. are applied (see discussion, Section V h). All receipts and issues after this preliminary stocktaking has been started are to be entered by the Stores Staff on the slips affected—subject to exception in the case of "retail" stock (see discussion re Wholesale Stock, Section IV c). The adjusted balances at the official stock-taking may be passed by inspection in conjunction with test counts in a number of instances. The slips after collection are marked in crayon with the Stock Ledger Reference, and then sorted accordingly for summarising on the Stock Inventory Sheet (below). Size of form may be 6" x 4" on thin manilla.

F. 139

Stock-Taking Slip.

31 December, 19										Division										Sheet No.									
Stock Ledger Ref.	Location	Item Ref.	Description.	Material.	G.R. No.	Quan.	Cwts.	Qrs.	Lbs.	Rate per	Value.	Group Totals.	Notes.																

These sheets constitute a summary of the particulars given on the Stocktaking Slips (above), and are rated and extended after summarising. Careful check is necessary of each stage in the clerical work. By collating the slips referring to each Stock Ledger Ref., it is feasible to get group totals corresponding in scope with the stock ledger balances. Investigation will be made of all important differences and corrections made in inventory or stock ledger as may be proper. Size of form may be 14½" x 10½".

F. 140

Stock Inventory Sheet.

Dept. Slip No.					
Office Order.		Sub-Order.		Item Ref.	
Description.		Material.		Weight in lbs.	
Present Stage.		Quantity.		Certified.	
Machine Work.	Hand Work.				

This slip deals with work in progress, including that lying in the Work Depot ready for assembling. The stages at which the work is reported to be, obviously affects the valuation, and undue refinement in that direction will greatly increase the work of valuing. It may be admissible to compromise by describing the stages as either Rough (R), Machined (M), in many cases as half-machined (½M), or even in quarter stages, Fitted (F), and so on. This approximation must be done by a competent person. Size of slip may be 2½" x 3½".

F. 141

Work-in-Progress Slip.

31 December, 19										Class of Order										Sheet No.									
Office Order No.	Dept.	Sub-Order	Item Ref.	Description.	Kind of Material.	Weight in lbs.	ESTIMATED VALUES.					Office Order Totals.	Cost Ledger Balances.	Inventory Value.															
							Materials.	Machine Wages.	Hand Wages.	Shop Charges.																			

These sheets are built up from the Work in Progress Slips (above), which are grouped according to office order ref. before being posted. The work of each department requires to be kept separate, more particularly to allow of more accurate averaging of shop charges by applying percentages to the totals of machine and hand wages. This approximation is done to minimise the work of valuation. The Ratefixer should be a suitable person to carry this valuation through. The grand total values under each office order No. are compared with the cost ledger balances (see discussion, Section VI g) and an inventory value adopted, for which the two sets of figures give adequate justification. It is sound practice to effect this valuation for all work in progress, but it should be considered imperative in the case of Stock Manufacturing Orders.

F. 142

Work-in-Progress Inventory Sheet.

CROSS REFERENCES.

F. 143—Loose Plant Rate Card.

PAGE	FORM
V K. 428 Loose Plant Valuation.	F. 82—Goods Received Note.
V K. 432 Loose Plant Classification.	F. 94—Completed Tool Advice.
	F. 144—Loose Plant Inventory Sheet.

F. 144—Loose Plant Inventory Sheet.

PAGE	FORM
V H. 389 Problem of Stocktaking.	F. 91—Tool Loan Slip.
V H. 394 Preparations for Stocktaking.	F. 92—Tool Permanent Loan Record.
V K. 427 Loose Plant Valuation.	F. 95—Tool Store Record Card.
V K. 432 Loose Plant Classification.	F. 143—Loose Plant Rate Card.

F. 145—Buildings and Fixed Plant Register.

PAGE	FORM
V J. 400 Plant Records	F. 64—Plant Record Card.
V J. 411 Control of Capital Expenditure.	F. 137—Plant Sub-Orders Cost Summary.
V K. 422 Valuation of Buildings and Fixed Plant.	

Rates per.....Class.....Class No.....									
For Dept.	Date.	G. R. Ref.	Completed Tool Advice.	Supplier.	Description.	Purchase Price.	Works Cost.	Replacement Value Rate.	Passed.

These rate cards constitute summaries of loose plant purchases of the respective classes (see classification, Section V k), and all loose plant made in the works, except as to jigs and special tools charged direct to orders. Provision is made on the cards for noting the replacement value rate as passed for the purposes of the annual valuation.

F. 143

Loose Plant
Rate Card.

31 Dec. 19..... Dept.....Group.....Sheet No.....												
Class No.	Class.	Particulars.	Notes re Condition.	Quan.	Cwts qrs. lbs.	Replacement Value.			Stock Value.			
						Rate.	Per.	Amount.	Rate.	Per.	Amount.	

These sheets may be entered up direct by the departmental foremen, and they should be assisted by the scheme of grouping suggested in Section V k—the groups being entered on separate sheets. The application of the class Nos. can be left to the Works Accounts Office when rating the items. In the case of the Tool Stores, the Chargehand should check his Tool Store Record Cards (F 95), and be able to make up the inventory sheets from them. A certain number of tools will be on permanent loan, and these are entered in Permanent Loan Record, which will require also to be checked against the tools themselves. Size of form may be 13" x 8".

F. 144

Loose Plant
Inventory
Sheet.

Replacement Values entered in red.										Group.....Sheet No.....			
Plant No.	Description.	Original Date.	Original Value.	Depreciation.		Additions.		Book Value.		Discarded Plant Value.	Extra Depreciation.	Location Notes.	
				Year.	%	Ref.	Amount.	Date.	Amount.				

This register is arranged for grouping of the plant on the lines of the discussion in Section V j, and the plant Nos. are assumed to be permanent, whatever the location. Instead of using a card for each item, as in the case of the Plant Record Card (F 64), three or four items are entered on each sheet, giving enough room for the entries likely to occur in the average life of the plant items. Exceptional items can have slips added to provide extra space for entries. It is not considered necessary to work out the depreciation on each machine and resultant book values each year, unless these have been additions altering the value and again when the plant comes under consideration for discarding. Tables are provided in Section V k for working out depreciation on remainder values for any range of years. The discussion in the same section deals with extra depreciation occasioned by the difference between the discarded plant value and the book value as reached by the operation of the fixed rate of depreciation. Particulars of the capital values of additions to any existing machine are derived from the Plant-Sub-Orders Cost Summary.

F. 145

Buildings and
Fixed Plant
Register.
(Loose leaf.)

CROSS REFERENCES.*F. 146—Labour Notification.**(Labour Requisition.)*

PAGE		FORM	
II A. 76	Design for Labour Administration Building.	F. 1—	Staff Application Form.
III A. 191	Labour Co-ordination Officer.	F. 16—	Workers' Employment Form.
III F. 240	Works Enquiry Office.	F. 17—	Workers' Reference Form.
III G. 254	Works Regulations—Lost Time.	F. 18—	Wages Advice.
III G. 255	Works Regulations—Transfers.	F. 20—	Discharge Note.
		F. 147—	Labour Order.
		F. 152—	Leave of Absence Ticket.
V B. 338	Discharge of Workers.		

Time Date Ref L.N.							
<p>To the Labour Co-ordination Officer (Works Enquiry Office).</p> <p>Please make the following arrangements subject to the requisite reference to the Management for approval.</p>							
ADDITIONAL LABOUR REQUIRED.	Quantity.	Duties or Trade.	Is experience essential ?	Reason.	To take effect.	Approved.	Dealt with.
TRANSFERS AND PROMOTIONS within the Dept. or to other Depts.	Check No.	Name.	Record.				
NOTICE OF SUSPENSION. — Discipline or shortage of work.							
LEAVE OF ABSENCE (on personal grounds) If for more than one shift.							
DISCHARGES RECOMMENDED AND NOTICES TO LEAVE RECEIVED.							
Dept..... Signed. Foreman.				ACKNOWLEDGMENT. L.N.			
On receipt of this Notification the Labour Co-ordination Officer or the Works Enquiry Clerk on his behalf becomes immediately responsible for all further stages, including sending of official advice to the workers concerned.				Mr. I have received your Labour Notification as above and am arranging for each item to be dealt with without delay. If any item is not approved I will let you know.			
Any or all sections of this form may be utilized as occasion demands.				Date L.C.O.			
<p>This form serves as a medium for centralising all action regarding the employment, transfer, promotion and discharge of labour, without undermining the Foreman's authority, while at the same time the Works Manager is placed in a better position to regulate labour changes and provide against arbitrary action. The foreman passes the form, when filled up to the requisite extent, to the Works Enquiry Office for the attention of the Labour Co-ordination Officer, whose duty it becomes at once to negotiate the various requests under the direct instruction of the Works Superintendent or possibly the Works Manager. A regular time should be made for receipt of notifications from the foremen and for the discussion with the Works Superintendent.</p>							

F. 146
Labour
Notification

CROSS REFERENCES.

F. 147—Labour Order.

PAGE
 II A. 76 Design for Labour Adminis-
 tration Buildings.
 III D. 215 Works Medical Referee.
 III F. 238 Selection of Workers.
 III F. 240 Works Enquiry Office.

FORM
 F. 1—Staff Application Form.
 F. 16—Workers' Employment Form
 F. 17—Workers' Reference Form.
 F. 146—Labour Notification.

F. 148.—Worker's Discharge Paper.
(Leaving Certificate.)

PAGE
 III F. 240 Works Enquiry Office.
 V B. 337 Engagement of Workers.
 V B. 339 Discharge of Workers.

FORM
 F. 20—Discharge Note.

Ref. 581.	To Employment Exchange. Labour Order 581.		Ref. 581.	F. 147 Labour Order.
	Please supply one..... for..... Dept.		Introduction to	
	Nature of work.....	 of	
Authority to call for Examination by Works Medical Referee. at a.m.	Minimum Qualifications.		Applicant for Vacancy.	
	Previous Experience on similar work. Essential. Non- essential.	Mental. Extra good. Alert. Ordinary.	Physical. Active. Strong. Heavy. Full Height. Ordinary.	Disabled. Sitting job. Walking job.
	Previous employees are only to be sent for interview after confirmation by telephone.			Date.....
	Date	Signed	Employment Exchange.	
W.R.O.	Works Enquiry Office.			

This form provides a medium for notifying the local Employment Exchange of additional workers required. Extra introduction coupons should be provided if the rule is to require more than one candidate to be submitted at a time for each vacancy. The procedure has most value for the lesser skilled occupations. The form is designed to inform the Exchange as to the minimum requirements enabling an ex-service man to be sent forward. The authorisation coupon for the applicant to call on the Works Medical Referee is retained at the Works Enquiry Office for use according to circumstances: Ex-service men with war disabilities require medical examination in their own interest, provided that the effort to fit the jobs to their disabilities is sincere.

ADVICE OF DISCHARGE.	ADVICE OF DISCHARGE.	WORKER'S DISCHARGE PAPER.	F. 148 Worker's Discharge Paper.
To Wages Allocation Office. Name Check No. at present on .. Shift is being discharged as from ..	To Time Office. Name Check No. at present on .. Shift is being discharged as from ..	This serves to certify that	
Time. Day. Date.	Time. Day. Date.	Check No. was employed at these works from .. to..... and at the time of leaving was working in the capacity of ..	
Signed.....Wages Office. Date	SignedWages Office. Date	Signed	
Time allocation recorded..... Agreed with Time Card..... Register adjusted.....	T.O. Register adjusted .. Time Cards withdrawn... Attendance Chart withdrawn... Employee's Record adjusted ..	Date of Issue	

This form is made out by the Wages Office in respect to each worker leaving as advised to them through the Works Enquiry Office by a Discharge Note F 20. Coupons are provided for notifying the Time Office and the Wages Allocation Office that they may complete and adjust their records at once.

The Worker's Discharge Paper itself is handed to the worker when settlement of wages due is made, and follows closely the Leaving Certificate practice of the Munitions of War Act, 1915.

CROSS REFERENCES.

*F. 149.—Individual Attendance Chart.**(Lost Time Chart.)*

PAGE	FORM
II A. 76	F. 18—Wages Advice.
Design for Labour Adminis- tration Building.	F. 19—Individual Rate and Earnings Record.
III D. 214	F. 20—Discharge Note.
Works Medical Referee.	F. 22—Time Card.
V C. 344	F. 23—Overtime Authorisation.
Punctuality.	F. 24—Gate Pass.
	F. 38—Accident Report.
	F. 152—Leave of Absence Ticket.
	F. 153—Casualty Log Book.

F. 150.—Lost Time Summary.

PAGE	FORM
III D. 214	F. 22—Time Card.
Works Medical Referee.	F. 38—Accident Report.
V E. 357	F. 152—Leave of Absence Ticket.
Departmental Statistics.	

Date of Starting.		Date of Birth		Name		Check No.	
Address							

10	1	2	3	4	20	30	31	Med. Cert. Ref.	Name of Doctor.	Cause of Absence and notes of Interview.	Date seen by W.M.R. L.C.O.	
Oct.												
Nov.												
Dec.												
19 Jan.												
Feb.												
Mar.												

F. 149
Individual
Attendance
Chart.

This form is designed to furnish a ready graphic record of time lost by each individual worker. A space is provided for each day of the month, and the records for six months can be made on each side of a 5 in. by 8 in. card. The mark O is made for each whole shift's absence and the mark / for each lateness. Accident absences are written in red; ordinary absences in black (day shift) and green (night shift). A blank card means perfect attendance. Note is made of Medical Certificates received. When the Works Medical Referee (W.M.R.) sees absentees on their return he makes notes accordingly on this chart. The Labour Co-ordination Officer (L.C.O.) may interview under some circumstances, and in that event makes record accordingly.

Shift										Week ending Wed.									
Day.	Date.	Total No. engaged on shift.	Late comers		No. of Absentees.			Percentage of Absentees.				Uncertified Absence.		Passes during Shift. (Hours lost.)					
			No.	%	Gross	Acci- dents	Leave	Net	Gross	Acci- dents	Leave	Net	No.	% of Net.	Acci- dents	Sick- ness.	No work.	Per- sonal.	
Thurs.																			
Fri.																			
Sat.																			
Sun.																			
Mon.																			
Tue.																			
Wed.																			
Average for week																			

F. 150
Lost
Time.
Summary.

Certified Time Office.

The value of this form lies in compelling the statistics of lost time to be kept in a consistent manner so that they can be used with confidence as to their real meaning and proper comparison made. The form is an echo of munitions conditions during the war, but is of importance for intelligent administration under ordinary conditions. The dissection of time lost through accidents is of special interest in trades where accidents occur at all frequently and will reflect the effectiveness of safety efforts better than compensation statistics.

CROSS REFERENCES.

F. 151.—Meal Pass.

PAGE		FORM
III G. 257	Works Regulations—General Restrictions.	F. 22—Time Card. F. 24—Gate Pass.

*F. 152.—Leave of Absence Ticket.**(Leave of Absence Pass.)*

PAGE		FORM
III G. 254	Works Regulations—Lost Time.	F. 24—Gate Pass. F. 146—Labour Notification. F. 149—Individual Attendance Chart. F. 150—Lost Time Summary.

F. 153.—Casualty Log Book.

PAGE		FORM
II A. 76	Design for Labour Administration Building.	F. 38—Accident Report. F. 149—Individual Attendance Chart.
III D. 229	Accident Treatment.	F. 154—Casualty Re-dressing Ticket.
III G. 255	Works Regulations—Accidents.	

F. 154.—Casualty Re-dressing Ticket.

PAGE		FORM
II A. 76	Design for Labour Administration Building.	F. 153—Casualty Log Book.
III G. 256	Works Regulations—Accidents.	

MEAL PASS	CANTEEN	MEAL PASS	DATE
Date This authorises Check No. to be served in the Canteen to-day from to Signed Foreman.		Date This authorises Check No. to take his meal to-day from to Signed Foreman.	
To be given up at the Canteen when used.		To be handed in at Time Office on return to work.	

F. 151
Meal Pass.

Date This is to authorise No. ... to be absent from work from to Reason Signed Foreman.	The Labour Notification provides a channel for authorising leave of absence for more than one shift. In all cases the Time Office requires authority, which the form here given provides, for absence with leave, to avoid needless enquiry and to keep correct statistics.
To be handed in at Time Office BEFORE leaving.	

F. 152
Leave of Absence Ticket.

Shift Date										Sheet No.		
Case No.	Name of Injured Person.	Check or Clock No.	Sex.	Age.	Particulars of Injury.	How caused.	Operation on which injured person was working at time of accident.	Was machine in motion at time of accident?	Time of accident.	Detail of treatment given.	Was work resumed.	Works Sup't advised. Accident Report No.
	Foreman. Witness.											

F. 153
Casualty Log Book.
(Loose Leaf).

This record is as simple in form as possible and yet serves to provide the basis information for an accident report, should absence from work follow. Every case treated should be entered. The end column provides for noting that the Works Superintendent has been advised briefly of the more serious accidents—this should be done very promptly. The log sheets pass each day to the Time Office for attention.

305		305	
Name	When an injury has been attended to TWICE at the Works Casualty Station, further dressings will only be given on production of this ticket signed by the Works Medical Referee.		
Check No.			
Notes.	Name.		Check No.
	W.M.R.'s Signature and Date.		Date to which Re-dressings allowed.

This form arises out of the necessity for the Casualty Nurse's responsibility being limited to first aid. Re-dressings are ordinarily a responsibility of the injured person's own doctor, but if there is a Works Medical Referee (W.M.R.) to watch the progress of accident cases, he should give specific authority from time to time as to re-dressing, to ensure successful treatment. The back of the ticket is used for instructions and for the nurse to enter dates of re-dressing.

F. 154
Casualty Re-dressing Ticket.

CROSS REFERENCES.*F. 155.—Job Ticket.*

PAGE	FORM
II G. 166 Shop Inspection.	F. 22—Time Card.
V D. 347 Job Records.	F. 25—Job Advice.
V D. 351 Timebooking Methods.	F. 26—Job Account Card.
V F. 360 Preparation of Wages Sheets.	F. 28—Weekly Time Allocation Sheet.
VI B. 451 Cost Allocation Principles.	F. 61—Job Record Sheet.
	F. 97—Operation Progress Ticket.
	F. 100—Work Tally or Machining Sub-Order.
	F. 166—Mechanical Tabulation Ticket.

F. 156.—Group Work Card.

PAGE	FORM
III C. 203 Engineering Trades Agreements.	F. 22—Time Card.
III G. 252 Works Regulations—Payment by Results.	F. 25—Job Advice.
V D. 351 Timebooking Methods.	F. 26—Job Account Card.
V F. 366 Extra Pay Computation.	F. 27—Daily Time Slip.
	F. 28—Weekly Time Allocation Sheet.

F. 157.—Pay Query Card.

PAGE	FORM
III G. 254 Works Regulations—Payment of Wages.	F. 22—Time Card.
	F. 29—Extra Pay Notification.
	F. 33—Pay Notification.
	F. 34—Unclaimed Pay Report.

Started Finished	Time.	Date.	Foreman's Sig.	Dept.	JOB TICKET No.		
Part No.	DESCRIPTION OF JOB.				No. off.	Order No.	
Drq. No.					Material.	Rough form.	
OPERATION (No.)					Operating allowance per place.		Certified.
					Prepara- tion allowance.		
					Extra allowances.		
Check No.	Workman.	Mach. No.	No. correctly fin'd Inspected by		Total Job Rate.	Hours taken	Extra Pay.

F. 155

Job
Ticket.

This form is an alternative to the joint use of the Job Advice (F 25) and the Job Account Card (F 26) and to an extent of the Progress Ticket (F 97). A carbon copy serves as an office record, time bookings being made on the back very much as with F 26. The ticket used in the shop is of card, and is either held by the worker or in a card rack—the latter if a time recorder is used for stamping times on and off. The viewing certificate is given on this shop copy of job ticket instead of a separate progress ticket being used.

Group Ref. No.		Day.	Shift	Date.		
Workers in Group				Particulars of Work	Quan	Job Rate.
Check No.	Name.	Rate.	Hrs in Group.	Time Work Notes		
Signed				on behalf of Group.		
				Passed		

F. 156

Group
Work
Card.

This card meets the case of a group, squad or gang of workers working together (in piecework known as working in fellowship). It is otherwise a very simple form of job ticket because usually the conditions of group work can be simply stated. Erecting is one of the more important instances, but unskilled labouring operations can often be dealt with usefully. It is desirable for each group to appoint one of their number to certify each card as correctly stating who is in the group and the individual times chargeable. An office copy or record is necessary whereon entries can be made of time booked and the extra pay computed. The latter is apportioned most readily to each worker in the group by first reckoning the percentage of extra pay to time wages as a whole (mechanical means are desirable) and then applying this percentage to the time wages of each worker. This allows direct settlement with each worker by the firm.

Check No.		This card has its justification in necessitating queries by the workers regarding pay being set out in writing, if the Time Office cannot settle the query without reference to the Wages Office, to whom these cards are sent. The card is of the size suitable for the time card racks and reaches the worker through that channel with the query answered. The Time Office should note the query cards sent to the Wages Office and mark off their return. This routine saves queries getting overlooked, and growing into grievances.
Name	Shift	
now working reports as follows with reference to pay for week ending		
Signed		
Report taken by	Query dealt with by	
Time Date	Date	

F. 157

Pay
Query
Card.

CROSS REFERENCES.

F. 158.—Plant Stoppage Report.

PAGE		FORM	
V J. 400	Plant Records.	F. 65—	Plant Efficiency Report.
V J. 404	Buildings and Fixed Plant Identification.	F. 96—	Plant Order.
V J. 412	Control of Repair Expenditure.	F. 106—	Departmental Memorandum.
VI c. 479	Functions of Standing Orders.		

F. 159.—Foreman's Requisition.

PAGE		FORM	
IV D. 323	Warehouse Requisitions.	F. 49—	Production Instruction.
V J. 413	Control of Repair Expenditure.	F. 54—	Purchase Requisition.
		F. 65—	Plant Efficiency Report.
		F. 96—	Plant Order.
		F. 106—	Departmental Memorandum.

Machine No. Oper. No. Machine stopped A.M. / / at P.M. / / Apparent cause of stoppage Section Hand. Passed ... Shop foreman.	Job No. To be filled in by Millwrights' Dept. Millwright Machine restarted A.M. / P.M. / /	This report is arranged in triplicate—one copy being retained by the Section Hand making out the report and the other two (one printed red and one black) passing to the Plant Repair or Millwrighting Dept. where a Job No. is given. There should be a board with a pocket for each plant item. The red copy of the report is placed in the respective pocket to indicate plant is stopped, and the other copy issued to the mechanic who is to execute the repair. Only minor repairs will be effected on the authority of these reports. Heavy repairs will necessitate a plant order (F 96) passed by the Works Manager. The job nos. above mentioned can be made up of a series no. and the account reference to guide allocation, e.g. 1301 R2/9 (p. 482). The red copies go forward in due course to the Works Account Office.
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F. 158
Plant
Stoppage
Report.

No 28718		Time and material involved by this requisition is chargeable to ORDER NO.
To Dept.	Date ..	
Issued by Dept. Signed ..		Foreman.
Reply to Foreman.	Requisition No. 28718.	ORDER NO.
Date ..		

F. 159
Foreman's
Requisition.

This form is an alternative to the Departmental Memorandum (F 96). It is designed to have its own reference no. and to quote the Order No. and/or Job No. concerned. It is written in triplicate—one copy retained for reference—one (black ink) sent to the department affected and one (red) passed to the Works Office (Production Section) for their information. Whoever receives the black ink copy is responsible for replying on the counterfoil at foot as to the action being taken. This style of reply counterfoil can be of great value in engendering confidence between departments and obviating delays. A form on similar lines can be adopted by the Works Superintendent in his instructions to foremen and by the Managing Director to the staff, etc., the counterfoil serving as an acknowledgment of instructions received, even if no reply otherwise is called for.

CROSS REFERENCES.

F. 160.—Interdepartmental Delivery Note.

Refer F. 108 for Cross References.

FORM

- F. 94—Completed Tool Advice.
- F. 96—Plant Order.
- F. 97—Operation Progress Ticket.
- F. 105—Weekly Component Shortage List.
- F. 106—Departmental Memorandum.
- F. 108—Works Product Note.
- F. 110—Warehouse Stock Control Book.
- F. 119—Finished Stock Product Summary.
- F. 126—General Stock Ledger.

F. 161.—Works Product Abstract.

PAGE

- VI A. 444 Diagram of Cost Accounting Stages.
- VI C. 493 Scrap Stock Values.
- VI D. 515 Rating of Process Products.
- VI E. 519 Purpose of Stock Production Accounts.
- VI F. 561 Sales Returns Stock Account.
- VI F. 565 Nature of Cost Returns.
- VI G. 569 Interlocking of Cost Accounts with Financial Accounts.
- VI G. 571 Works Product Abstract.
- VI G. 573 Cost Ledger.

FORM

- F. 118—Process Product Summary.
- F. 119—Finished Stock Product Summary.

Date I.D.N.		<p>This form may be used as an alternative to the Works Product Note (F 108), and in some circumstances the Operation Progress Ticket (F 97). It has, however, independent functions in serving for the handing over of work or material, particularly plant, that is outside any strict production routine. The form is in triplicate—one copy is retained, one copy accompanies the work and one goes to the Work Office (Production Section) for reporting progress.</p>																									
To Dept.																											
Please receive																											
	<table border="1"> <tr> <th>Cwt.</th> <th>Qrs.</th> <th>Lbs.</th> </tr> <tr> <td colspan="3">Quantity.</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>			Cwt.	Qrs.	Lbs.	Quantity.																				
Cwt.	Qrs.			Lbs.																							
Quantity.																											
Made according to Order No. Foreman's Regulation No.																											
Signed	Dept																										
Received	Dept.																										

F. 100

Inter-departmental
Delivery
Note.

**SUMMARY OF AMOUNTS TO BE DEBITED TO WORKS MATERIALS SUSPENSE ACCOUNT
AND CREDITED TO THE UNDERMENTIONED ACCOUNTS.**

Fortnight ended No.

F. 161

Works
Product
Abstract.

Process Product Summary.	Finished Stock Product Summary.		Posting Ref.	Works Value or Production Cost
		Process Product <i>Process Account, Iron Foundry</i> <i>Process Account, Brass Foundry</i> <i>Process Account, Smithy</i>		
		Finished Stock <i>Stock Production Account</i>		
		Returns from Customers <i>Sales Order Account</i> <i>Sales, Repairs and Sundries Order Account</i>		
		Scrap not credited to Cost of Orders <i>Scrap Account</i>		
		Scrap credited to Cost of Orders <i>Works Material Suspense Account</i>		

This abstract is outlined here to show the form in which the Works Account Office report to the Financial Department as to works product that has to be charged to stock through the Works Materials Suspense Account and the items in question finally re-allocated as "materials" of a later stage. The later stage for process products is usually a machining order for stock components. The later stage for finished product usually means allocation to a Sales Despatch Order. The details on which the abstract is founded are aggregated on either the Process Product Summary (F 118) or the Finished Stock Product Summary (F 119). The abstracts are furnished at periods corresponding with the cost accounts, fortnightly being about the shortest convenient period.

CROSS REFERENCES.

F. 162.—Works Cost Allocation Abstract.

PAGE	FORM
VI A. 444	Diagram of Cost Accounting Stages.
VI A. 445	General Scheme of Cost Accounts.
VI B. 471	Works Expenses.
VI B. 471	Developments and Experiments.
VI C. 493	Works Sundry Accounts.
VI D. 505	Process Cost Allocation.
VI E. 520	Purpose of Stock Production Accounts.
VI F. 555	Production Oncosts Accounts.
VI G. 565	Nature of Cost Returns.
VI G. 568	Interlocking of Cost Accounts with Financial Accounts.
VI G. 577	Works Cost Allocation Abstract.
VI G. 579	Balancing of Cost Ledger.
	F. 129—Cost Allocation Card I.— <i>Direct Materials and Disbursements.</i>
	F. 130—Cost Allocation Card II.— <i>Stock Issues.</i>
	F. 131—Cost Allocation Card III.— <i>Wages.</i>
	F. 132—Cost Ledger.
	F. 133—Cost Transfer Journal.

Fortnight ended No.		Ma- terials.	Dis- burse- ments.	Wages.	Production Overhead (Shop Charges).	Posting Ref.	Total Works Cost.	F. 182 Works Cost Allocation Abstract.
OFFICE ORDER SERIES	A Sales (Despatch or Special Production)							
	B Sales Repairs and Sundries (Despatch or Special Production)							
	C Stock Production							
	D Experiments							
DEPART- MENTAL PROCESS ACCT'S	G Iron Foundry							
	H Brass Foundry							
	K Smithy							
STAND- ING OR- DERS— WORKS CRAFT- TAL ADDI- TIONS	N1-1 Drawings and Patterns							
	N1-2 Jigs, Special Tools and Gauges							
	N2-1 Land and Buildings							
	N2-2 Motive Power Plant							
	N2-3 Mechanical Transmission							
	N2-4 Electrical Transmission							
	N2-5 Pipe Transmission							
	N2-6 Transportation Plant							
	N2-7 Shop Fixtures							
	N2-8 Special Process Plant							
	N2-9 Machines							
	N3-1 Loose Plant							
	N3-2 Office Equipment—Works							
N3-3 Office Equipment—General								
STAND- ING OR- DERS— WORKS REPAIR EX- PENSES	R1-1 Patterns							
	R1-2 Jigs and Special Tools							
	R2-1 Land and Buildings							
	R2-2 Motive Power Plant							
	R2-3 Mechanical Transmission							
	R2-4 Electrical Transmission							
	R2-5 Pipe Transmission							
	R2-6 Transportation Plant							
	R2-7 Shop Fixtures							
	R2-8 Special Process Plant							
	R2-9 Machines							
	R3-1 Loose Plant							
	R3-2 Office Equipment—Works							
STAND- ING OR- DERS— WORKS GENE- RAL EX- PENSES	S1-1 Power Generation Expenses							
	S1-2 Power from outside sources							
	S1-3 Heating Expenses							
	S1-4 Lighting Expenses							
	S2-1 Building Attendance							
	S2-2 Mechanical Plant Attendance							
	S2-3 Electrical Plant Attendance							
	S2-4 Belting Attendance							
	S2-5 Tool Dressing and Sharpening							
	S2-6 Plant Removals and Alterations							
	S3-1 Rents, Rates, Taxes, Fire Insurance and Prevention							
	S3-2 Works Management & Administration							
	S3-3 Drawing Office General Expenses							
	S3-4 Works Stationery							
	S3-5 Sundry Minor Expenses							
	S4-1 General Stores & Warehouse Expenses							
	S4-2 General Carriage & Package Expenses							
	S4-3 Material Testing and Treatment							
	S4-4 Timber Preparation and Storage							
	S4-5 Interdepartmental Transportation							
	S5-1 Accident Compensation							
	S5-2 National Insurance Expenses							
	S6-1 Departmental Stores Expenses							
S6-2 Departmental Sundries								
S6-3 Overtime Expenses								
S6-4 General Labour								
S6-5 Supervision and Inspection								
S6-6 Unproductive or Waiting Time								
STAND- ING OR- DERS— WORKS SUNDRY AC- COUNTS	U1-1 Expenditure chargeable to Commer- cial Expenses							
	U1-2 Repairs to Office Equipment (General)							
	U2-1 Scrap Stock Values							
	U3-1 Returnable Packages Suspense Account							
	U3-2 Expenditure Suspense Account							
	U3-3 Cost Allocation Differences Account							
	U3-4 Works Additions Costs written back							
	U3-5 Discarded Plant Stock Values							
	Totals							

This illustration indicates the form of the Works-Cost Allocation Abstract furnished fortnightly by the Works Account Office to the Financial Department. The details are derived from the Cost Ledger (F 182) but grouped by mechanical means, or on an intermediate summary, under the respective headings shown. This grouping allows the utmost sub-division desired in the Cost Ledger without entailing corresponding elaboration in the Financial Accounts.

CROSS REFERENCES.

F. 163.—Works Accounts Annual Abstract.

PAGE	FORM
V J. 411 Control of Capital Expenditure.	F. 132—Cost Ledger.
V K. 417 Depreciation Rates.	F. 134—Production Oncosts Book.
VI A. 444 Diagram of Cost Accounting Stages.	F. 140—Stock Inventory Sheet.
VI A. 445 General Scheme of Cost Accounts.	F. 142—Work-in-Progress Inventory Sheet.
VI B. 459 Disbursements.	F. 144—Loose Plant Inventory Sheet.
VI C. 496 Expenditure Suspense Account.	F. 164—Works Profit and Loss Account.
VI D. 503 Process Cost Allocation.	
VI F. 552 Normal Works Expenses.	
VI F. 557 Production Oncosts Accounts.	
VI G. 565 Nature of Cost Returns.	
VI G. 569 Interlocking of Cost Accounts with Financial Accounts.	
VI G. 571 Works Accounts Annual Abstract.	
VI G. 578 Works Product Abstract.	
VI G. 580 Cost Ledger.	

31st December 19...		Posting Ref.	Totals.	F. 163 Works Accounts ANNUAL Abstract.
1. WORK-IN-PROGRESS VALUES				
Sales (Special Production) Orders				
Sales, Repairs and Sundries (Special Production) Orders				
Stock Production Orders				
Departmental Process Account—Iron Foundry				
" " " —Brass Foundry				
" " " —Smithy				
2. VALUES TO BE CARRIED FORWARD				
Developments and Experiments				
Drawings and Patterns				
Jigs, Special Tools and Gauges				
3. STOCK VALUES				
General Stock				
Component Stock				
Complete Product				
Loose Plant				
Office Equipment (Works)				
Discarded Plant Scrap Values				
4. DEPARTMENTAL PROCESS ACCOUNT DIFFERENCES				
Iron Foundry				
Brass Foundry				
Smithy				
5. STOCK PRODUCTION ACCOUNT DIFFERENCES				
6. DEPRECIATION FOR YEAR				
	Normal Depreciation at Average Rate on Adjusted Book Values.	Extra Depreciation on individual dis- carded items.		
Buildings				
Motive Power Plant				
Mechanical Transmission				
Electrical Transmission				
Pipe Transmission				
Transportation Plant				
Shop Fixtures				
Special Process Plant				
Machines				
7. ADVANCE EXPENDITURE				
Proportion of Rates paid in advance				
Proportion of Fire Insurance Premiums paid in advance				
" " Compensation " " "				
8. LIABILITY RESERVE				
Materials delivered and included in cost allocation or stock valuation but not invoiced				
Estimated guarantee liabilities for the year's output				
9. WAGES RESERVE				
Wages included in cost allocation but not paid before the end of year				
10. WORKS EXPENSES SUPPLEMENTARY DISTRIBUTION				
Additional distribution as under				
Series A—Sales Orders				
B—Sales Repairs and Sundries Orders				
Stock Production Account				
Departmental Process Accounts				
11. INTEREST ON WORKS CAPITAL				
Amount included in Production On-costs Accounts				
..... Managing Director. Works Manager. Works Accountant.				
The above skeleton form reflects the practice advocated on pp. 571-6, to which reference should be made.				

CROSS REFERENCES.

F. 164.—Works Profit and Loss Account.

PAGE	FORM
V G. 385	Stock Values for Profit and Loss Account.
VI B. 454	Material Allocation.
VI B. 469	Errors and Defects
VI C. 493	Works Sundry Accounts.
VI C. 494	Scrap Stock Values Account.
VI E. 520	Purpose of Stock Production Accounts.
VI E. 523	Rating of Finished Stock Product.
VI F. 531	Cash Discounts.
VI F. 561	Departmental Process Summary Account.
VI F. 562	Stock Production Differences Account.
VI F. 562	Development and Experimental Account.
VI F. 563	Production Oncosts Supplementary Account.
VI G. 570	Interlocking of Cost Accounts with Financial Accounts.
VI G. 572	Values to be Carried Forward.
VI G. 573	Stock Values.
VI G. 574	Guarantee Liability Reserve.
VI G. 578	Works Value of Deliveries.
VI G. 580	Cost Ledger.
	F. 132—Cost Ledger.
	F. 134—Production Oncosts Book.
	F. 138—Delivered Orders Cost Abstract.
	F. 140—Stock Inventory Sheet.
	F. 142—Work-in-Progress Inventory Sheet.
	F. 144—Loose Plant Inventory Sheet.
	F. 163—Works Accounts Annual Abstract.



31st December 19a.		Cr.	F. 164
			Works Profit and Loss Account.
Work In Progress Values at beginning of year		Works Product charged to stock Departmental Process Account Stock Production Account	
Stock Values at beginning of year		Works Deliveries (Invoice values) Sales Orders Sales Repairs and Sundries Orders	
Production Costs allocated during year		Cash Discounts on works purchases not otherwise credited	
Departmental Process Accounts		Works Expenditure chargeable to Commercial Expenses	
Stock Production Account		Works repairs to General Office Equipment	
Sales Orders		Scrap sold but not credited to individual orders	
Sales Repairs and Sundries Orders		Work In Progress Values at end of year	
Supplementary distribution of works expenses not dealt with by the Production oncosts (shop charges) (Sub-divisions as above)		Stock Values at end of year	
Amounts to be written off or reserved in excess of those included either in production oncosts or the supplementary distribution above indicated			
Guarantee Liabilities			
Developments and Experiments			
Drawings and Patterns			
Jigs, Special Tools and Gauges			
General Stock			
Component Stock			
Complete Product			
Loose Plant			
Office Equipment (Works)			
Works Profit or Trading Margin for the year carried to the Final Profit and Loss Account			
£		£	

The above skeleton account is shown as having application to a year's working but can be applied as a fortnightly statement, if that period is adopted for cost and stock account purposes. Mechanical means of aggregating totals, in the works accounts, are imperative if short period profit and loss accounts are required. Certain of the finer adjustments indicated are not likely to be undertaken except half-yearly or yearly. It will be noted that the differences of overcharge or undercharge, in connection with process and stock production accounts, are incorporated above by virtue of the total costs being debited and the total value of the product, as charged to Stock, credited—the work in progress values at beginning and end of the period being incorporated also. As set out, the amounts included in production oncosts for Depreciation and Interest on Capital Employed are assumed to be correctly computed and no additional reservations found necessary at the end of the period. The smaller the amounts thrown in to the works profit and loss account by way of adjustment, after the cost accounts are completed, the better, as otherwise the costs may be appreciably incorrect as to the real production oncosts. The question of Patent upkeep and depreciation, if given a capital value, is ignored as being a commercial charge. Patents constitute a selling rather than a production advantage. Patent expenses may, therefore, be treated as a debit against the final profit and loss account, and the commercial oncost rates adopted should discriminate as necessary.

CROSS REFERENCES.

*F. 165.—Credit Claim Note.**(Debit Note.)*

PAGE		FORM	
IV C. 297	Rejections and Replacements.	F. 82—	Goods Received Note.
VI B. 461	Purchase Credits.	F. 84—	Returnable Package Card.
		F. 98—	Viewing Report.
		F. 113—	Advice of Returns.
		F. 117—	Works Accounts Register (III.)— <i>Purchase Credits.</i>
		F. 122—	Suppliers' Package Record.

*F. 166.—Mechanical Tabulation Ticket.**(Cost Tabulating Ticket.)*

PAGE		FORM	
IV C. 290	General Stock Classification.	F. 26—	Job Account Card.
V D. 349	Job Records.	F. 28—	Weekly Time Allocation Sheet.
V J. 405	Building and Fixed Plant Classification.	F. 30—	Wages Allocation Weekly Sum- mary.
V K. 429	Loose Plant Classification.	F. 129—	Cost Allocation Card—I. <i>Direct Materials and Disbursements.</i>
VI B. 464	Cost Allocation Requirements.	F. 130—	Cost Allocation Card—II. <i>Stock Issues.</i>
VI B. 475	Cost Allocation Agreement.	F. 131—	Cost Allocation Card—III. <i>Wages.</i>
		F. 155—	Job Ticket.

Ref. C.....Date.....	
M.....	
We have to notify you that we have provisionally debited your account with the amount given below for the reasons stated, and shall be glad to have your Credit Note in confirmation per return.	
Goods supplied under our Purchase Order No.	Reason
Date and No. of your Invoice	Particulars.
Goods in question returned	
To you on	
as per Advlee. AD.....	
Viewing Report No.	Cost Allocation Reference
Credit Note Received.	For and on behalf of

F. 155

Credit
Claim
Note.

This form is self-explanatory and is the more ordinary debit note in a different guise, as being less arbitrary and equally effective as an accountancy instrument.

DATE		CLASS OF LABOR		QUANTITY		MACHINE		MACHINE		MACHINE	
Y	M	1	2	1	2	1	2	1	2	1	2
0	2	3	3	0	0	0	0	0	0	0	0
1	2	3	3	1	1	1	1	1	1	1	1
2	2	3	3	2	2	2	2	2	2	2	2
3	2	3	3	3	3	3	3	3	3	3	3
4	2	3	3	4	4	4	4	4	4	4	4
5	2	3	3	5	5	5	5	5	5	5	5
6	2	3	3	6	6	6	6	6	6	6	6
7	2	3	3	7	7	7	7	7	7	7	7
8	2	3	3	8	8	8	8	8	8	8	8
9	2	3	3	9	9	9	9	9	9	9	9

F. 166

Mechanical
Tabulation
Ticket.

The basis of the tabulating machine system, both Powers and Hollerith, is the use of a card, after the style of the above illustration, wherein holes are punched which derive a specific value or meaning according to their location on the card. The punched card forms a kind of stencil which, when placed in the tabulating machine, controls indicator plungers or rods, so as to convey the "hole" values to what may be called a series of cyclometers—thus a punching through a figure 3 has the effect of moving the respective cyclometer forward either 3, 30, 300 or whatever column is concerned. Other values on the card may merely have an identifying or selective use, such as order no. and the columns set aside for these purposes can be put outside the range of a cyclometer, so becoming non-additive. The whole system is fascinating in its unerring accuracy and amazing speed in interpreting the "stencils," giving totals for whatever set of figures are required. The wizard element is suggested by the mechanism for sorting the punching cards before attempting any totals. Thus the punched cards pertaining to any particular order or any other identification are automatically sorted and re-sorted at the rate of 250 to 300 per minute. Little imagination is necessary to appreciate the variety of statistics obtainable, if necessary, from the same initial records. For detail job costing, the system is invaluable.

VIII

GENERAL INDEX

SUPPLEMENTARY INDEX TO SPECIMEN FORM TITLES
TOGETHER WITH ALTERNATIVE TITLES

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GLOSSARY APPENDIX

Notes on some of the terms, in black type, preferred by the Author. A few are admittedly old and well known but their interpretation requires modernising. Alternative terms given in italics are not ordinarily used in the book on the grounds that, although used in Industry, they do not indicate exactly enough the desired meaning or have too limited an application.

Administration.

Organisation and its effective application covering thereby all phases of management, in the personal sense, and at the same time every step in the procedure by which management becomes operative.

Administrative Records.

The comparatively non-technical records necessary to administration, and yet outside the strictly production routine, such as Timekeeping, Timebooking, Wages, Stock Accounts (as distinct from Stock Control) and Plant Records.

Apportionment of Works Expenses.

The process of determining the incidence of works expenses to departments and producing units, whether reflecting actual cost allocation or the outcome of applying some formula appropriate to the respective class of expenses.

The term obviates using allocation in any other sense than cost allocation. (See also *Distribution of Works Expenses*.)

Production Oncost Rates are derived from the apportionment of Works Expenses.

Appropriation.

The earmarking of stock material or product to particular purposes.

Assembly Unit.

See *Component and Design Index*.

Auxiliary Supplies.

Materials that are necessary to production but do not enter into the saleable product. They may be allocated as *secondary materials* under prime costs or as *departmental sundries* under works expenses. The alternative term to *non-productive material*.

Basis Values.

The value adopted as a starting point for computing depreciation or as a reference stock value. With the alteration in money values, original costs have little relation to replacement costs. The essential principle of basis values is that of replacement costs and the term *replacement values* has accordingly been used as well.

Bulk Material.

Material not in unit form directly suited to the work in hand, e.g. Bar, Tube, Sheet, and material not measurable except by weight or volume.

Casualty.

Personal injury or illness occurring on the works and requiring first aid treatment. Alternative term to *Accident*. *Works Casualty Station* is an alternative term to *Ambulance Room*. *Casualty Nurse* is an alternative term to *First Aid Attendant*.

Component.

The separate pieces entering into a complete product. **Part Nos. (P.N.)** are used to identify the respective pieces.

A group of components assembled to form a definite element of the complete product is called an *Assembly Unit (A.U.)*.

The final assembly or erection of the constituent *Assembly Units*, and

usually, separate components in addition, makes the **Complete Product**, which is identified by a Design Index No. for each particular specification.

Conditional Liabilities.

Liabilities that cannot be foreseen with any precision, e.g. guarantee liabilities in regard to workmanship; obsolescence of material arising out of changes in production requirements; obsolescence of plant through improved methods or altered conditions of manufacture.

Control.

Used in the sense of management and applied to particular phases, such as **Production Control**, **Traffic Control**, **Stock Control**, and not in the accountancy sense, of a check against an original record or "counter-roll." For accountancy purposes the term **agreement** is preferred.

Cost Allocation.

The procedure of allocating **Works Expenditure** to particular jobs or accounts. The procedure and term apply equally to **Production Orders**, **Capital Additions** or **Works Expenses**.

In case of works product put into stock and then drawn out for use in a more complex product, two stages of cost allocation, **initial allocation** when the article is manufactured for stock and **final allocation** when the manufactured article is drawn from stock and applied as materials to a further purpose.

Cost Returns.

The stage in cost accounting wherein the results of **cost allocation** are brought to a head and embodied in summaries or abstracts. The term has special reference to the returns necessary to the interlocking of the cost accounts with the financial accounts.

Departmental Sundries.

Materials of consumable nature involved in departmental operations or processes not entering into the product itself and not requiring separate classification. Fuel, for instance, might be included amongst "sundries" in a plumber's shop, though treated separately as fuel in connection with power generation.

An alternative term to *Miscellaneous Shop Supplies*.

See also **Auxiliary Material**, **Secondary Material**.

Design Index No.

An identification reference for each particular specification of **complete product**.

Despatch Order.

A form of official sales order directing the despatch to the customer, of product as delivered to the **Warehouse**, apart from the question of the reference under which the product in question may have been manufactured. Under some conditions a Sales Order may be a Special Production Order but a Sales Despatch Order would not be used for production purposes. The costs of the product charged to a Sales Despatch Order would be the value as charged to Warehouse stock.

Developments.

Applied to expenditure that serves to improve the product itself or the output of same as distinct from experiments directed to definitely new product. To obviate arbitrary distinctions in the accounts and for income tax purposes, expenditure on both **Developments** and **Experiments** is brought together in one account.

Disbursements.

Expenditure other than wages for services rendered and for which no goods pass, e.g. rent, rates, taxes, insurance premiums, salaries.

Distribution of Works Expenses.

The application of **Production Oncosts** to the items of product has the effect of distributing the works expenses. The alternative term of **allocation**, while not unsuitable, is better reserved for the more direct processes of **cost allocation**.

Due Dates.

The dates planned for completion of specific stages or completion of production on particular batches of work.

See **Production Regulation**.

Equivalent Percentage.

The percentage applied to the gross amount which will give the same result as a certain percentage applied to the net or basis amount or *vice versa*. Thus 42.86 per cent. must be applied to the net sale price to give the same sum as 30 per cent. applied to the list price.

Extra Allowances.

See **Job Rate**.

Extra Pay.

The pay earned under any system of payment by results (whether piecework, premium, or collective bonus) over and above guaranteed time wages, overtime allowances, or any special monetary allowance.

Financial Management.

Secretarial functions under the direction of the Board of Directors, and comprising all Company Law requirements, the preparation of financial accounts (as distinct from **Cost Accounts**) and the payment and collection of accounts.

See **Frontispiece**.

Form of Material.

Denoting the form in which the material is available for a given operation, e.g. as **Bulk Material** (Bar, Tube, Sheet) or as **Process Product** (Casting, Forging, Stamping).

Gate Control.

The functions of administration concerned with the general safeguarding of the works property and regulation of traffic in and out of the works, whether of workers, visitors, or vehicles. Railway traffic over a works siding comes under the head of **Traffic Control** and in the case of vehicular traffic some compromise may be necessary as to the limit of gate control.

Goods Issue Voucher.

The form on which demand is made from the Stores for materials; on the strength of which the Storekeeper is held to have satisfactorily accounted for his stock. The term voucher is used to imply the same responsibilities on the part of the Storekeeper for safe custody and authorised issue or disbursement as obtains with the Cashier for cash held.

Grade Mark.

A system of marks applied to castings to differentiate as to their character in point of production costs per unit of weight. Such grades may be Intricate, Ordinary, Plain. The scheme is a compromise between one common flat rate for all classes of castings and separate costs for each casting produced, so far as such an ideal is attainable.

Inclusive Cost.

Total Production Costs together with the appropriate **Commercial Oncosts**.

Job Rate.

The contract basis under any system of payment by results. More usually associated with individual workers under piecework or premium system. An alternative term to *Piece Price*; *Time Limit*.

The practice of expressing job rates in terms of time under piecework the same as under premium system eliminates the disturbing effect of alterations in wages hourly rates.

A term adopted many years ago by a noted firm was that of *co-operative* job rate, the principle being much the same as the premium system (Halsey-Weir method). The term is one that might advisably have had a much wider acceptance and could be revived with advantage to-day.

It is of great importance also to divide the job rate under (1) **Preparation Allowance** for each new start and (2) **Operating Allowance** for each piece worked on. This eliminates for the most part, the effect of the difference in quantities of work.

Job Rates may have to be supplemented by **Extra Allowances** in respect to handicaps outside the worker's control.

Labour Administration.

Industrial relations within the factory, as between Capital and Management on the one hand and Labour on the other, in general principle and in detail application. The term includes consideration of Government

Regulations affecting the workers, Trade Union Agreements, Working Conditions, Works Regulations, etc.

Labour Co-ordination Officer.

A liaison officer between the workers and the management, clearing up difficulties and exercising definite administrative functions in certain directions such as regulating additional labour, transfers of workers, lost time and disciplinary investigations.

He also acts as Secretary of the Works Co-ordination Committee.

While he does all the useful work of the war-time welfare worker, he does much more and does it as an ordinary business necessity.

Material Control.

The purchase and custody of "dormant" material—e.g. in General Stores, Component Stores, Warehouse—as distinct from the control of work in progress, which is a matter of production regulation, operating through a work depot, and falling, as a technical issue, under production control.

Material Service.

A form of production service having special reference to material handling and custody. Under some circumstances it may be made the occasion of a material service charge or addition to the material costs.

Net Production Costs.

Those costs of production which are directly involved in every batch of the same articles. Other costs vary, e.g. production preparation costs (drawings, patterns, special tools and gauges) usually occur with the initial order only. The costs of errors and defects are in the nature of contingencies of varying magnitude and accordingly should be kept separately. Final Inspection and Despatch Costs are to a large extent dependent on the conditions of each sales order. By keeping the net production costs as a separate total, comparison between successive production orders is put on a proper basis.

Non-Purchase.

A term designed to group receipts of goods not covered by a purchase order, such as samples for trial; goods received on approbation, goods returned by customers.

Non-Sale.

A term for conveniently grouping all expenditure not entering into saleable product, or product intended for sale.

It includes experimental work and capital additions equally with works expenses.

Oncosts.

Those costs which cannot be associated intimately with the items of product, in other words the difference between prime costs and inclusive costs.

It is necessary to differentiate between production oncosts and commercial oncosts.

An alternative term to *Establishment Charges, Overhead Charges, Indirect Costs*.

Operating Allowance.

See Job Rate.

Ordering Level.

The stage in the maintenance of stock where replenishment should be put in hand. The same object as that aimed at by a maximum and minimum stock is achieved in a more positive way. The normal ordering quantity specified will provide the high limit and the consumption likely to occur, while replenishment is being made, will provide a low limit.

Pattern Mark.

The identification reference for patterns to avoid confusion with part or component nos. An alternative to *pattern no.*

Percentage Ratio.

The ratio between two quantities expresses as a percentage, the one of the other. Thus, the ratio of 25 to 75 would be 1:3 or 33 per cent. (in this case, the less of the greater).

Production Allowance.

See Job Rate.

Prime Costs.

Those costs of production that are intimately associated with the individual items of product. They will consist in the first instance of **Direct Wages** (Wages directly expended on operations affecting the form of the product) and **Direct Material** (entering directly into the product).

Under some circumstances other wages that do not directly effect the form of product, such as inspection, supervision, personal assistance, may be allocated with sufficient accuracy to the prime cost of production under the designation of **Secondary Wages**. Similarly some materials not entering into the product may be allocated as **Secondary Material**, such as fuel and oil used for an engine trial.

Process Product.

The product of a related series of operations within one department, but having more particular application where the product is of bulk character and where the units of products do not require individual treatment. In a foundry, for instance, process conditions obtain, because the metal melted is not separately prepared for each kind of casting and the individual castings are in this sense portions of bulk material, in not dissimilar way to the conditions of, say, chemical manufacture.

Producing Unit.

The effective unit in production; for machine work the individual machine; for hand work the individual worker.

Production Control.

Signifies the more technical machinery for effecting production efficiency from the lay-out of the factory to inspection of product. The more human aspect is dealt with under **Labour Administration** and the purely material aspects, as to purchases and stock, under **Material Control**.

Production Estimating.

The investigation of the possibilities of production with a view to determining a measure of output for each operation, thus providing the basis for the fixing of **Job Rates**, known as **Ratefixing**, for any system of payment by results.

Production Estimating involves the determination of methods and sequence of operation and covers the technical aspect of what is known in U.S.A. as *Scientific Management*.

(See also **Production Regulation**).

Production Management.

This term indicates the function of works management but is given a broad interpretation, including with technical production such questions as Design of Product, Buying of Material, Works Accounts. (See *Frontispiece*).

Production Preparation Costs.

Costs, in the way of preliminary work, peculiar to the first order for any given product. In the case of machine making these will consist of drawings, patterns, special tools and gauges. These costs would not ordinarily arise on a repeat order.

Production Regulation.

The regulation of work in progress as to its initiation and completion—particularly as to determining **due dates**.

Its meaning is broadly that of *planning*, but a certain elasticity, to meet the moment's needs, and a sense of active control is conveyed by the word "regulation."

The planning of operation sequence is included under **Production Estimating**.

Production Service.

A group of related works expenses constituting a service pertaining to production, such as Power Service.

Ratefixing.

See **Production Estimating**.

Rating.

The application of a rate for stock or cost purposes, that may or may not include a margin for wastage, or may represent an average cost. An alternative to *pricing*, which may advantageously be restricted to invoice purposes, either purchase or sales.

Ratio.

See Percentage Ratio.

Routine.

The regular actions of an administrative nature called for by any given scheme of organisation. An alternative to some extent to *commercial organisation*, which implies the commercial application only of its activities.

Secondary Material.

See Auxiliary Supplies and Departmental Sundries.

Secondary Wages.

See Prime Costs.

Social Aspects of Employment.

This describes the many questions affecting the interests of adult labour that are outside the strict field of factory administration, e.g. recreation and education. It is only reasonable to encourage these developments and this may go to considerable length so long as paternalism is not indulged in. The workers should be influenced to interest themselves in their own welfare and not require to be provided with ready made "welfare."

Special Product.

Product made for a particular contract as distinct from Stock Product made, in principle, in anticipation of Sales Orders.

Special Purchases.

Purchases made for particular production orders, whether sales or stock. Such purchases are usually allocated direct to the intended order but the goods should be held as special stock, to be released only on adequate authority confirming their application, very much on the lines of ordinary stock material.

Stock.

Any goods held in a **Stores** or **Warehouse** in anticipation of shop requirements. It is often desirable to allow **special purchases** to be held in temporary suspense as special stock, as distinct from ordinary stock. Goods drawn from Stores into the **Work Depot** under specific order references becomes **work-in-progress** and ceases to be stock until returned to Stores or Warehouse.

Complete product ready for despatch does not however pass into stock, although it may go to the Warehouse, if it has been specially manufactured under a Sales Production Order, and therefore remains **work-in-progress** to the end.

Stock Scrutiny.

The routine of checking stock quantities by an independent official and carried out for some item or other every day or few days. A convenient rule is never to approve replenishment of stock without a test has been made. The object is to provide a system of audit for the **stock control records** so that they shall have unquestioned acceptance as a *perpetual inventory*; at the same time a high standard of storekeeping and cost allocation can be induced.

Stores.

The repository for stock goods, whether materials as bought (Raw Materials) or works product held for machining or assembling (Rough and Finished Components).

Surveys.

As applied to Statistics, means a review or summing up of results at stated periods.

Swarf.

Metal cuttings as produced by machining operations.

Timebooking.

The recording or booking of time spent on individual jobs as distinct from **timekeeping** which is the record of attendance apart from how the time is spent.

Timebooking should be accompanied normally by a record of work done as passed by a viewer.

Time Production Cost.

Prime Costs plus **Production Overheads**, but not **Commercial Overheads**. When all three factors are included the result is the **Inclusive Cost**.

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Trading Margin.

The difference between total production cost and net selling price. The alternative term is *gross profit*, which is a misnomer because commercial oncosts have to be provided for as well as profit. To talk of gross profit is a looseness of phrase conveying a wrong impression to an uninformed public.

Traffic Control.

The direction of all traffic and goods into, out of and about a works. The co-ordination under one head is the more imperative where there is a railway siding running into the works.

Unproductive Time.

Time lost through interruptions of work outside the workers control—offer words waiting time. An alternative term is "*idle time*" but as idleness is a term of reproach its use in this connection is not quite appropriate. The reproach, if any, rests on the management rather than the worker. Under payment by results *extra allowances* on the *job rate* will be necessary to meet these cases.

Viewing.

The examination or inspection of work between the various operations or stages of manufacture, as distinct from final inspection of the completed product. The *viewer* is employed to inspect each worker's output and his certificate is usually the basis of payment under any system of payment by results.

Wages Cost.

This term is used in preference to Labour Costs not as in itself any better but to keep the term labour to its more personal meaning. Wages cost includes Time Wages with any overtime allowances and also *Extra Pay* arising out of payment by results. Special monetary allowances not covered by the preceding definition may be treated as *Disbursements* rather than as Wages.

Warehouse.

The repository for product in saleable form, such as *complete product*, spare parts, factored goods.

The term is old and is mentioned here to call attention to spare parts being held apart from the *Finished Component Stores*, that is, if the finished components have to be assembled prior to sale.

Wholesale Stock.

Stock held substantially in reserve, comparatively small quantities being passed over to a "*retailing*" section of the stores from time to time, for issue for specific jobs.

Work Depot.

A clearing house for work in progress. Materials are drawn from the Raw Material Stores or Component Stores and issued for machining or assembling, being returned to the Work Depot when finished. The Work Depot hands over completed product to the Warehouse.

The Work Depot is the works centre for *Production Regulation*.

Work in Progress.

Material in any stage or form that has ceased to be *stock* in the custody of a Stores and has not become saleable stock product in the custody of the Warehouse. An alternative to *Work-in-Progress*.

Works Accounts Office.

The office controlled by the *Works Accountant* and responsible for Timekeeping, Wages, Production Statistics and Costs. It is better to adopt a term like Works Accounts of wide meaning than apply the term *costs* beyond its legitimate scope. *Works Accounts* comprise *Administrative Records* and *Cost Accounts*.

Works Co-ordination Committee.

A Works Committee consisting of representative workers of each trade and each department elected by secret ballot. The word co-ordination is inserted to give the objective of the scheme without implying joint control in the management of the works.

Works Enquiry Office.

A clearing house for labour engagements and records whether *enquiries* of applicants for employment equally with those of workers can be dealt with. It comes under the direction of the *Labour Co-ordination Office*.

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is the old-time Gatehouse (apart from timekeeping dealt with by the Time Office) developed to a degree appropriate to Labour's higher standing in industry. An alternative term is *Employment Office*.

Works Expenditure.

All expenditure incurred through or by the works of whatever character. It should not be confused with works expenses which absorb only a part of the total expenditure.

Works Patrols.

Gatekeepers, Watchmen or other Attendants responsible for exercising Gate Control.

Works Regulations.

The "working drawings" of Labour Administration by which order and comfort is assured rather than an arbitrary discipline attempted. An alternative to *Works Rules*.

